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A

SYSTEM

OF THE

NAVY

OF THE

HUMAN BODY

CONTENTS

A

SYSTEM

OF THE

ANATOMY

OF THE

HUMAN BODY;

ILLUSTRATED BY

UPWARDS OF TWO HUNDRED TABLES, CONTAINING NEAR A THOUSAND
FIGURES,

COPIED FROM

THE MOST CELEBRATED AUTHORS,

AND

FROM NATURE.

BY ANDREW FYFE.

IN THREE VOLUMES.

SECOND EDITION, WITH ALTERATIONS AND IMPROVEMENTS.

VOL. II.

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1806,

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HUMAN BODY;

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BY WILLIAM WATTS

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OF THE

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PART IV.

OF THE

VISCERA

AND

ORGANS OF THE SENSES.

VOL. II.

A

OF THE VISCERA AND ORGANS OF THE SENSES.

OF THE COMMON INTEGUMENTS.

CUTICLE.

THE *Cuticle*, *Epidermis*, or *Skarf-skin*, is a thin semi-transparent insensible Membrane, which covers the Skin, and adheres to it by small Vascular Filaments. Tab. LVI. Fig. 1. *a*.

The Cuticle is readily separated from the Cutis by boiling water, or by putrefaction, and, in the living body, by the application of blisters.

It is not every where of the same density, being, even in the Fœtus, thickest in the Palms and Soles; in which parts, the thickness is afterwards much increased by pressure. Tab. LVI. Fig. 3. *a*.

The *External Surface* is marked by *Furrows*, which correspond with those in the Cutis Vera. Tab. LVI. Fig. 4.

Upon the Surface of the Body it is perforated by the terminations of the Exhalent Vessels, which throw out the Perspirable Matter; and this Matter, when increased in quantity, is considered by most of the modern Physiologists as forming the Sweat. It is perforated also by the ends of the Excretory Ducts, which are found only in particular parts of the Skin; by the beginnings of the Absorbents, which take in certain Substances applied to the Surface of the Skin; and by the different Hairs. Tab. LVI.—Tab. LVII.

The *Perforations*, or *Pores*, are most evident upon the Palms and Soles, and upon the Nose, Ears, and external parts of Generation. Tab. LVI.—Tab. LVII.

The Cuticle covers the Skin through its whole extent, excepting under the Nails.

From the External Surface of the Body, it is reflected inwards, to line the large Passages; as the Alimentary Canal, the Trachea, the Urethra, Vagina, &c.

In these Passages, however, the Cuticle becomes less uniform in its texture; and in some of them, as in the *Stomach*, it is either wanting, or is so much changed in structure, as to have the appearance of being so.

From the Surface of the Cuticle, certain *Processes* are sent into the Skin, which line the Passages by which the Cutis is perforated.

Many opinions have been advanced concerning the *Origin* of the Cuticle. The latest and most probable is,

that it is formed by a condensation of the *Corpus Mucosum*, or by the extremities of Excretory Vessels;—its density, however, is such, that no Vessels can be traced in it, either by the eye, or by the assistance of glasses.

The Cuticle serves to protect the sensible parts under it; and to regulate the proportion of the Fluids thrown out, or taken in by the Surface of the Skin;—particularly to prevent too great a degree of evaporation.

CORPUS MUCOSUM.

The *Corpus Mucosum* has been commonly called *Rete Mucosum*, from the supposition that it is formed of a *Mucous Net-work*. It is situated under the Cuticle which it connects to the Cutis Vera. Tab. LVI. Fig. 3. *f, f*.

It is composed of the terminations of extremely minute Vessels passing between the Cutis and Cuticle, which are surrounded by a Mucilaginous or Viscid Substance, properly called *Corpus Mucosum*.

It is the chief cause of that *variety of colour* which characterises the natives of different climates, and different people of the same climate, being white, or rather of a light gray semi-transparent colour, in the European, black in the Ethiopian, brown in the Asiatic, &c.

It is thicker and stronger in the Negro than in the White Person, Tab. LVI. Fig. 4. *i*. and in the former can be separated into two Layers.

It covers every part of the Surface of the Cutis, excepting below the Nails, where it is wanting; and is of such a light colour in the Palms and Soles of the Negro, as to have been supposed by some Authors to be deficient there also.

Its *Origin* has not yet been sufficiently ascertained, nor is it fully determined what particular purposes it serves.

Among other purposes, however, it contributes to preserve the structure of the tender Vessels, Ducts, and Papillæ, placed between the Cutis and Cuticle; and in the Negro, it is supposed to serve as a defence against the heat of the climate, by preventing the rays of the Sun from penetrating the Skin.

CUTIS VERA.

The *Cutis Vera*, or *Skin*, properly so called, lies immediately

mediately under the Corpus Mucosum, Tab. LVI. Fig. 1.—4. and gives a general Covering to the whole Body.

It is *formed* of Fibres intimately interwoven, and running in every direction, and is so plentifully supplied with Nerves and Blood-vessels, that the smallest puncture cannot be made in any part of it, without occasioning pain and a discharge of Blood.

The *Blood-vessels* of the Cutis are so numerous, as to appear to form almost the whole of its Substance, and are of such a size as to be injected with facility. Tab. LVII. Fig. 1. 2.

It is strong and elastic, and may be elongated in every direction, after which it recovers its former dimensions.

It forms the Body of the Skin, and is that part in Quadrupeds of which Leather is made.

The *outer part* of it is dense and firm; the inner loose, and gradually degenerating into the common Cellular Substance.

It is thicker and looser on the posterior than on the anterior part of the Body, and thicker and firmer in the Palms and Soles than in the other parts of the extremities.

The *colour* of the Cutis also differs in different parts of the Body, in proportion to the quantity of Blood in the extreme Vessels, and to the thinness of the Cuticle.

At the *edge of the Eye-lids*, the *red part of the Lips*, and *margin of the Anus*, the Cutis becomes so immediately and remarkably thin, as to appear to be lost.

Upon the Surface of the Cutis, Tab. LVI. Fig. 8.—12. *small Eminences* are observed, called *Papillæ*, *Papillæ Nervosæ*, and *Papillæ Pyramidales*;—the term being borrowed from the Papillæ of the Tongue, which were first discovered, and to which the name is most applicable.

They are considered as forming the Organ of Touch, from their being extremely sensible; and from their being very Vascular, they are also regarded as furnishing a passage to part of the Perspirable Matter.

The *Papillæ* are most evident in the Palms and Soles, where they are placed in double rows upon the Ridges, which, on the points of the Fingers and Toes, generally run in a somewhat spiral and parallel direction. Tab. LVI. Fig. 12.

The *Ridges* are supposed to defend the Papillæ, and to increase the Surface for Perspiration.

In some places, as in the red part of the Lips, the Papillæ, from their resemblance to the pile of Velvet, are termed *Villi*. Tab. LVI. Fig. 13.

Various kinds of *Folds* are observed in the Skin; some depending upon the form of the Cellular Substance, as in the Hips, others on Muscular Contraction, as in the Fore-head; and others on Articular Motion, as at the Joints of the extremities,—particularly those of the Fingers and Toes;—and these Folds, to allow easy motion, are thinner than the rest of the Skin.

In an *inflamed Skin*, as in the case of Small-pox, a Reticular Texture of Vessels is observed, which can be easily injected, and has been considered by some as the Corpus Mucosum, and by others as an additional Cuticle;—but no such appearance is to be met with in the sound Skin.

The Cutis Vera serves to cover and give form to the Body; unites the different parts, and defends them from injury; forms the External Organs of Sensation or of Touch; and gives passage to the Fluids which are perspired or absorbed.

APPENDAGES OF THE SKIN.

NAILS.

The *Nails* were formerly regarded as a continuation of the Papillæ of the Cutis, but are now more generally considered as a continuation of the Cuticle.

They are removed along with it by boiling water, or by maceration.

Like the Cuticle, they are insensible, are renewable after having been separated, and have no evident Vessels.

They differ from it, however, in structure; being formed of *Plates*, and the Plates of *Longitudinal Fibres*, which are closely compacted.

They begin by a square root, a little before the last Joint of the Fingers and Toes.

When separated from the Skin, they are *transparent* like Horn, but are coloured in the living Body by the Vessels of the Cutis, to which they adhere, and from which they derive their nourishment.

They are fixed at their roots to a *semilunar Fold* of the Cutis, and are there covered by a reflection of the Cuticle, which firmly adheres to them. Tab. LVII. Fig. 5.

They grow from the roots, and not from the points.

The Nails strengthen, and defend the ends of the Fingers and Toes, and thereby serve as Buttresses.

In the Fingers they increase the power of apprehension, being useful in laying hold of minute objects.

HAIRS.

The *Hairs* arise by Roots or Bulbs, which are situated in the Cellular Substance under the Skin. Tab. LVII. Fig. 9. 10.

The *Bulbs* are of various shapes in different parts of the Body, and have Blood-vessels dispersed upon them for their nourishment.

Each of the Bulbs has *two Membranes*, or *Capsules*, containing an Oily Fluid between them, which gives colour to the Hair, and for want of which, as in advanced life, or in certain diseases, the Hair is supposed to change its

its colour, and become white. It may be remarked, however, that the Hair, after being cut off, continues uniformly to preserve its colour.

The body of the Hair consists of smaller Hairs inclosed in a membrane, and is somewhat of the nature of the Nails. Like them also, it grows only from the root.

The Hairs serve in general for the ornament, warmth, or protection of the different parts on or near which they are placed.

SEBACEOUS DUCTS or FOLLICLES, and MILIARY GLANDS.

The *Sebaceous Follicles* derive their name from the Fluid they contain becoming like Suet, after acquiring a certain degree of consistency, or being inspissated by stagnation.

They are seated under the Cutis, and are found in greatest abundance in those parts which are exposed to the air, or to attrition; as in the Nose, Ears, Nipples, Groins, and external Parts of Generation. Tab. LV. —LVI.

The *Sebaceous*, or *Miliary Glands*, are so called from their Contents, and from their resemblance to *Millet Seeds*, and are seated in the Axilla. Tab. LVII. Fig. 12.

Other Miliary Glands are described by Authors as being placed under the Skin over the whole Surface of the Body, and as serving for the secretion of Perspirable Matter;—but they are not demonstrable to such a general extent, and the Sweat is considered as being derived from another source.

These Follicles and Glands secrete a Fluid which serves to lubricate the Skin, and defend it from the inclemency of the weather, or from the effects of friction.

MEMBRANA CELLULARIS, or TELA CELLULOSA, or RETICULAR, or CELLULAR SUBSTANCE.

This is generally considered as one of the Integuments, though common to these and to the other parts of the Body.

It is composed of a fine Web, formed of many Membranes joined irregularly together, and these made up of Cells, which communicate freely with each other wherever they are found.

It is very elastic, may be drawn out to a considerable extent, after which it suddenly recoils, and may be condensed or compacted to a great degree.

It lines the Skin, covers the Muscles in general, and insinuates itself between their different Fibres;—is an universal Covering to all the other parts, and even enters into the composition of almost every one of them.

It is thickest where the parts are most exposed to pressure, as in the Hips, Palms, and Soles.

The different Cells of which it is composed are constantly moistened by an Interstitial Fluid, and in many parts of the Body are filled with Fat.

It has little or no Sensibility, can be handled freely, or cut, or punctured without giving pain.

It serves to connect parts to each other, but so as to prevent them from growing together;—it covers them, supplies them with Sheaths to move in, and contains the Fat.

CORPUS ADIPOSUM, ADEPS, PINGUEDO, or FAT.

The *Fat* is lodged in the common Cellular Substance but without communicating with it, and is made up of Masses composed of small Vesicles containing the Fat, Tab. LVII. Fig. 13.—15. and these are surrounded by a net-work of Blood-vessels, from which the oily matter composing the Fat is supposed to be secreted, without the intervention of Glands.

The *Vesicles* are not found to have any communication with each other, nor have any Excretory Ducts yet been perceived in them,—the Fat being supposed to transude from the Cells.

It is of *different consistency* in different parts of the Body: In the living Body it is generally fluid, though in some parts it approaches to a solid, and is altogether of this nature in the dead Body.

In the Bones, it forms the *Marrow*, which has been already described.

The Fat is chiefly *situated* immediately under the Skin, and covers almost the whole Surface of the Body. It is also found between the different Muscles and Fibres of Muscles,—within the Orbits, and in the Cheeks,—in the Substance of the Mammæ, and about the Heart.

It *abounds* in the Abdomen, about the Kidneys, Loins, Omentum, and Mesentery;—and in the Joints it forms the Substances called *Glands of the Joints*, already mentioned.

The Fat is *a-wanting* in the Scrotum, Penis, and Eyelids, and is found only in small quantity in the Fore-head, or about the Joints, where, from its bulk, it would have been inconvenient.—It is also a-wanting in the Substance of the Viscera situated in the great Cavities of the Body; as the Brain, Lungs, Liver, Spleen, Kidneys, &c.

The Fat serves to lubricate every part of the Body to which it is connected, and facilitates the action of the Muscles. It fills the Interstices, so as to give form and smoothness, and guard against pressure. It serves also as a reservoir of nourishment.

PANNICULUS CARNOSUS.

This is a general Covering found in the Quadruped, and formed by a thin Sub-cutaneous Muscle, which serves to agitate the Skin.

It is found only in certain parts of the Human Body; as in the Fore-head, where it is formed by the Occipito-Frontalis; and in the Neck, where it is formed by the Platysma Myoides.

The Ancients described this as an additional Covering.

TABLE

T A B L E LVI.

VIEWS of the COMMON INTEGUMENTS.

See Tab. XXXVIII. Fig. 2.

FIG. 1.

Part of the INTEGUMENTS of the MAMMA of a Woman thirty-two years of age.

- a, b,* The cuticle, with the corpus mucosum, and roots of the hairs reflected; *a,* Part of the cuticle from which the corpus mucosum has been separated. The roots of the hairs pass through pores of the corpus mucosum, and adhere to vaginulae, or processes of the cuticle.
- c,* The cutis vera, upon which the folds of the skin and pores of the hairs appear.
- d,* The subjacent fat.

FIG. 2.

Part of the CUTICLE and CORPUS MUCOSUM separated from the same MAMMA.

- a,* The external surface of the cuticle, with the hairs.
- b,* The internal surface of the cuticle, with its processes, to which the hairs adhere.
- c,* The corpus mucosum separated from part of the cuticle, and reflected.
- d,* The corpus mucosum adhering to the cuticle; the inner surface being here seen.—The roots of the hairs appear white, from the processes of the cuticle adhering to them.

FIG. 3.

Part of the SKIN of the HEEL, with its Layers separated some way from each other.

- a, a,* The cuticle of great thickness.
- b,* The corpus mucosum separated from the cuticle, and turned down.
- c,* The inner surface of the corpus mucosum.
- d,* The outer, and,

- e,* The inner surface of the cutis vera.
- f, f,* Small filaments which pass from the cutis to the cuticle; making a connection between the two, and forming part of the corpus mucosum.

FIG. 4.

A Portion of the SKIN of a Negro, with its Layers separated and turned down.

- a,* The cuticle turned down.
- b,* The cuticle thicker and stronger than in the European, also turned down.
- c,* The joints and pores for the hairs, seen on the external surface of the cutis vera.
- d,* The cut edge of the skin.

FIG. 5.

A Portion of the INTESTINUM RECTUM of an Ethiopian, inverted.

- a,* The *raphè*, or futura perinei.
- b, b,* The perineum.
- c, c,* The situation of the anus, where the external integuments of the perineum pass to the inner surface of the rectum. The transverse rugae which appear are owing to the inversion of the rectum.
- d, d,* The longitudinal rugae of the rectum, among which the larger mucous follicles are placed.
- e, e,* The mouths of simple glands, or mucous cells, with which the rectum abounds, uncommonly large in the preparation from which the figure was made.

FIG. 6.

The EAR of a Child; the CUTICLE and CORPUS MUCOSUM being removed.

Upon the surface of the skin are seen innumerable minute pores, among which are interspersed larger foramina, especially about the concha.

FIG.

Fig. 1.

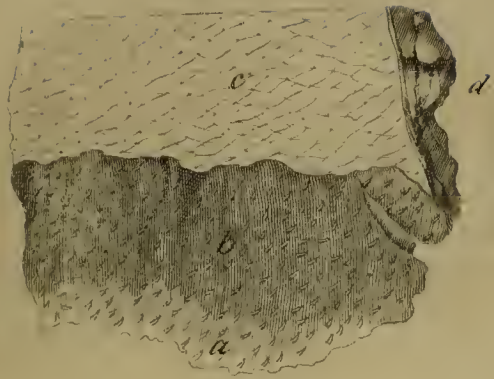


Fig. 4.

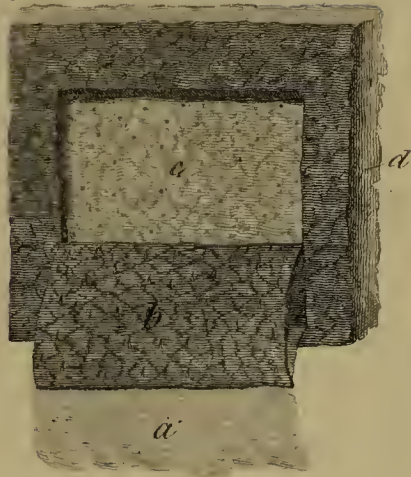


Fig. 2.

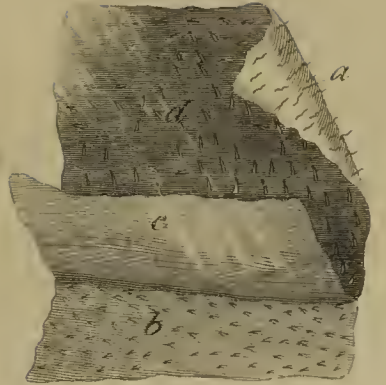


Fig. 3.

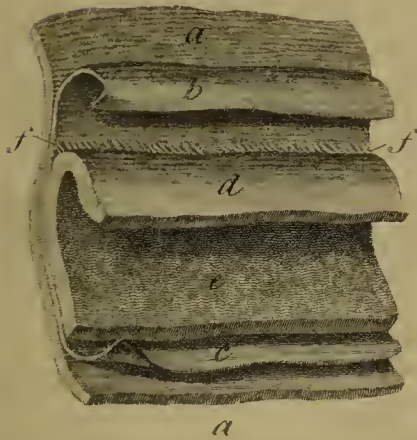


Fig. 5.

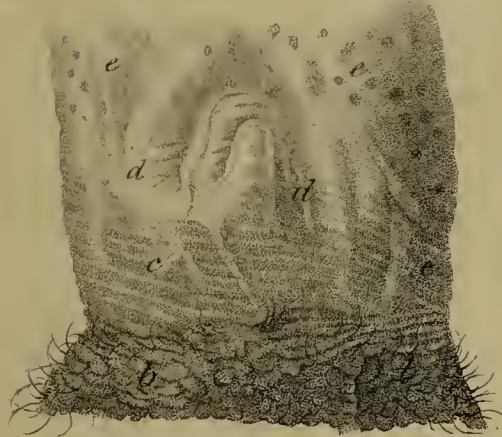


Fig. 6.

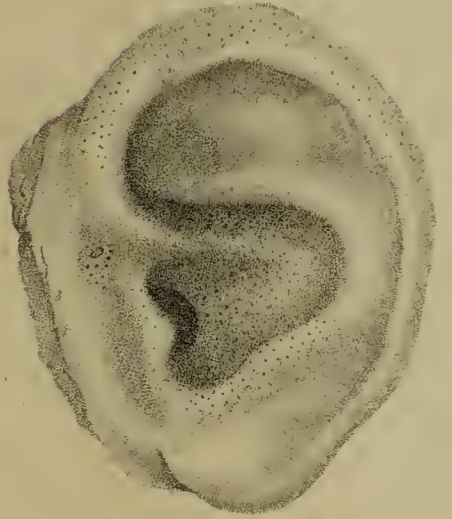


Fig. 7.



Fig. 8.

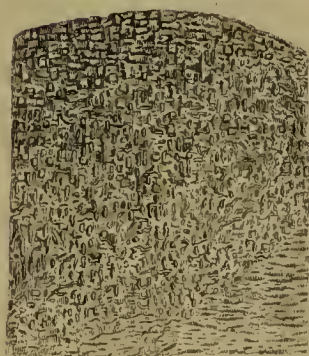


Fig. 10.

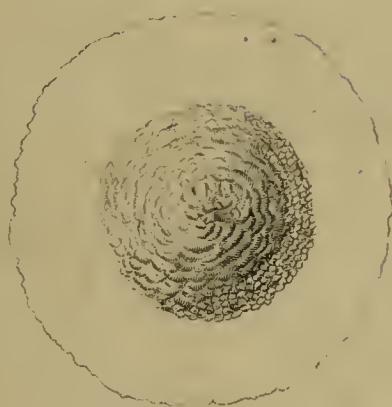


Fig. 9.

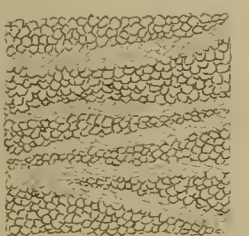


Fig. 11.

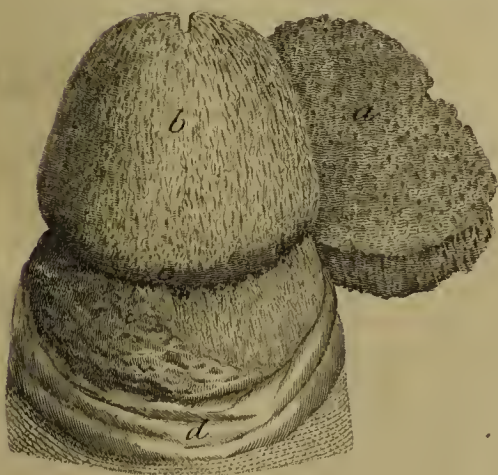


Fig. 12.



Fig. 13.



FIG. 7.

Part of the NOSE and UPPER LIP of a Man, from which the CUTICLE and CORPUS MUCOSUM is removed.

The cutis appears full of small pores, with larger ones interspersed; the larger ones abound most about the passage into the nostril. The red part of the lip is covered with villi.

FIG. 8.

Part of the SKIN of the HEEL of an Adult Man, from which the CUTICLE and CORPUS MUCOSUM are removed.

It appears full of papillæ of different sizes, being commonly larger about the middle of the heel; towards the middle and sides of the sole they are smaller.

FIG. 9.

The Inner Surface of a small Bit of the CUTICLE and CORPUS MUCOSUM removed from the ARM, and viewed through a Magnifying Glass.

The darker spaces represent the foveolæ of the corpus mucosum, in which the papillæ of the cutis are lodged. The white streaks are eminences which correspond with fissures or plicæ on the external surface of the cutis.

FIG. 10.

Part of the MAMMA of a Girl, from which the CUTICLE and CORPUS MUCOSUM are removed.

It is full of papillæ, among which are the incisures of the skin.

FIG. 11.

The Extremity of the PENIS, from which the CUTICLE and CORPUS MUCOSUM have been separated. The CORPORA CAVERNOSA are distended.

- a, The cuticle, with the corpus mucosum separated from the glans, and inverted.*
- b, The glans, full of papillæ.*
- c, The corona glandis, in which larger papillæ, with the sebaceous glands, appear.*
- d, The prepuce turned back.*

FIG. 12.

The PALMAR SURFACE of Part of the Second JOINT of the THUMB in the living Body, viewed with a Magnifying Glass.

The figure shews the course of the ridges upon which the papillæ are placed.

In the ridges also are seen innumerable pits, which are frequently filled with a thin fluid,—the matter of perspiration.

FIG. 13.

The LIPS represented from the Inner and Back Part, to shew the VILLI.

- a, The skin and fat.*
- b, The inner membrane of the lips covered with villi.*
- c, The aperture of the mouth.*

T A B L E LVII.

VIEWS of the SKIN and its APPENDAGES.

FIG. 1.

The ARTERIES of the SKIN.

The figure shews part of the skin of the fore-head of a child about three years old, the arteries of which are injected. The larger branches were cut from their trunks in separating the skin; the smaller shew innumerable anastomoses with each other; all running in a serpentine direction.

FIG. 2.

Part of the SKIN of a Child, after the ARTERIES had been injected with Wax, and the Preparation put into Spirit of Turpentine.

FIG. 3.

The VEINS of the SKIN.

This figure shews part of the cutis of the leg of a young woman; the larger veins run under the skin, the smaller belong to the skin, and shew many anastomoses. They differ from the arteries painted in Fig. 1. in their greater size, in the straighter course of their branches, and in their larger intermediate spaces.

FIG. 4.

The ABSORBENTS of the SKIN.

The figure shews part of the skin of the thigh, below Fallopius's ligament, with the absorbents injected with quicksilver.

a, A subcutaneous absorbent cut off at the inner part of the thigh, and turned back with the skin. A little higher are seen the division of this branch into two others; the anastomoses of the absorbents, and extremely minute branches passing from the substance of the skin, to join them.

b, The place where the absorbent *a* passes from the cutis to cellular substance.

c, The cutis separated from the sub-cutaneous cellular substance, and turned towards the pudendum.

d, d, The sub-cutaneous cellular substance and fat.

FIG. 5.

Part of the GREAT TOE of an Adult Man, from which the Nail is separated and turned aside.

a, b, c, The part from which the nail is separated; *a*, A white spot of the skin, corresponding with the white root of the nail; *b, c*, Longitudinal lines; *c*, The extremities of these, termed *Papillæ*, where the cuticle recedes from the extremity of the nail.

d, d, Sulci where the margins of the nail adhered.

e, The inner surface of the nail;

f, Its white root.

g, g, h, The cuticle; *g, g*, Its outer surface; *h*, Its inner surface lined with the corpus mucosum.

FIG. 6.

A Section of the SKIN from the Side of the HEAD, with the HAIRS passing from the Sub-cutaneous Cellular Substance, taken from a dried Preparation.

a, The external surface of the skin.

b, The subjacent fat. The bulbs of the hairs go from the cellular substance and fat, and perforate the substance of the skin.

FIG. 7.

A Section of the SKIN from the CROWN of the HEAD of an Adult, to shew the Depth of the Bulbs of the HAIRS.

FIG. 8.

A Portion of the SKIN of an Adult Man, taken from the Fore-Part of the THIGH, with the subjacent FAT.

The cuticle and corpus mucosum are removed, yet the hairs remain, retaining their vaginulæ or processes of the cuticle.

FIG. 9.

A small Segment of the INTEGUMENTS, comprehending two HAIRS viewed through a Microscope.

a, Part of the hairs rising above the skin.

b, The

Fig. 3.



Fig. 4.



Fig. 1.

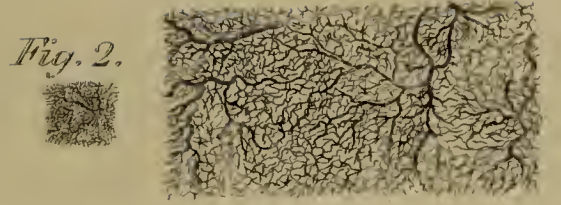


Fig. 2.



Fig. 5.



Fig. 6.

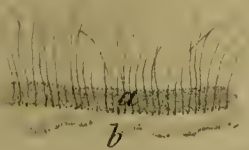


Fig.

7.



Fig. 8.

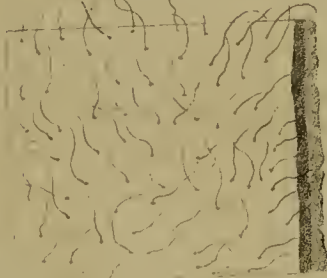


Fig. 11.

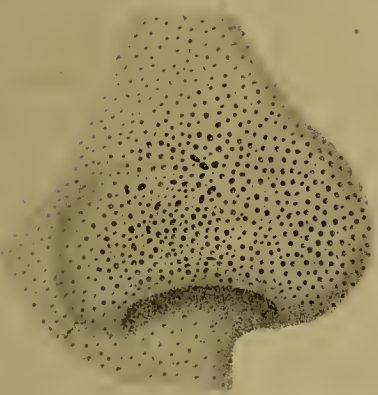


Fig.

10.



Fig. 9.



Uf

Fig. 16.



Fig.

12.

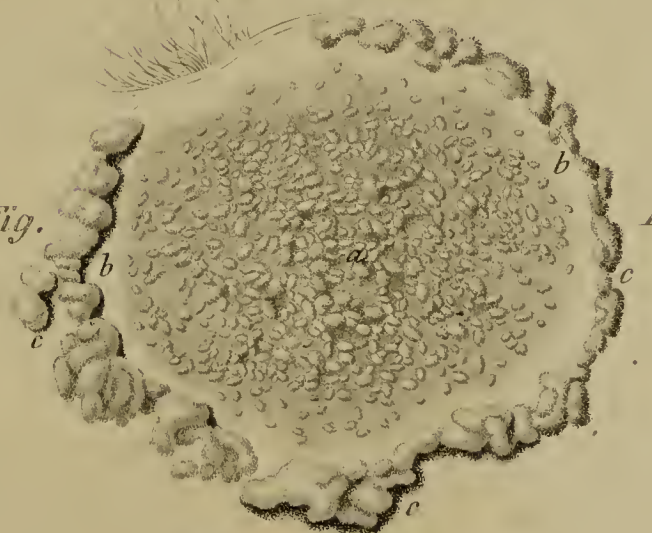


Fig. 13.

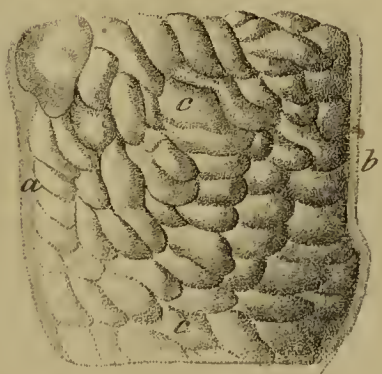


Fig. 15.

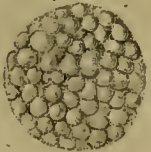
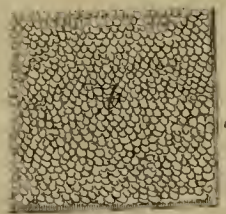


Fig.

14.



- b*, The denser part of the skin.
c, The sub-cutaneous fat.
d, d, The vagina of the hair, or a peculiar cellular substance surrounding it.
e, e, Fibres sent out from the hairs.
f, The portion viewed in the microscope, here seen of the natural magnitude.

FIG. 10.

A HAIR pulled from the SUPERCILIUM, and, a few Hours afterwards, viewed in a Microscope.

- a*, The body of the hair.
b, The bulb.
c, Filaments or radicles which adhere to it.
d, e, A canal in it, partly replete with juice at *d*, and partly empty at *e*.

FIG. 11.

The CUTIS of part of the NOSE of an Old Person, the CUTICLE and CORPUS MUCOSUM being removed.

In the cutis, besides the pores of the skin in general, are seen many sebaceous follicles, which are most conspicuous about the ala nasi and point of the nose. Within the larger are observed others of an inferior size opening into them.

FIG. 12.

A Portion of the INTEGUMENTS taken from the AXILLA of an Adult, to shew the Appearance of the SEBACEOUS GLANDS.

- a*, The glands adhering to the inner surface of the cutis.

- b, b*, The bare surface of the cutis.
c, c, c, The fat dissected from the inner surface of the cutis, and left adhering to the edges of it.

FIG. 13.

FAT taken from the Fore-Part of the Thigh of a recent Adult Body.

- A*, The interior surface of the skin, from which the fat has been separated by the knife.
b, The thickness of the cut edge of the skin.
c, c, The fat which forms larger and smaller portions.

FIG. 14.

The FAT taken from the Fore-Part of the THIGH of a Fœtus of eight Months.

- a*, The cut edge of the skin.
b, The fat formed into flat granulæ.

FIG. 15.

A small Portion of the Sub-cutaneous FAT of the Human Body, viewed with a Microscope, which increases its Diameter about thirty times.

FIG. 16.

Represents the same Piece of FAT with that shewn in the former Figure, viewed through a Microscope, which magnifies it to near one hundred and fifty Diameters.

OF THE BRAIN.

THE term *BRAIN* is applied to the whole of that Mass which, with its surrounding Membranes, fills the Cavity of the Cranium, and is larger in Man, in proportion to the size of the Body, than in any other Animal.

The *Membranes* of the brain were called *Meninges* and *Matres* by the Ancients, from an idea that they gave birth or origin to all the other Membranes of the Body.

They consist of the *Dura Mater*, *Tunica Arachnoidea*, and *Pia Mater*.

The *DURA MATER*, named from its being of a firmer texture than the other two Membranes, incloses the Brain with all its Appendages, and lines the different parts of the Cranium. Tab. LVIII.—Tab. LIX.

It is composed of one Membrane, which, in several parts, is divisible by maceration into two, or even more layers of Fibres.

The texture of the *Dura Mater* is very dense. It is the thickest and strongest Membrane of the Body, and is composed of Tendinous-like Fibres, which have a shining appearance, particularly in its inner Surface. In many parts these Fibres run in a variety of directions, and decussate each other at different angles.

The *Dura Mater* adheres every where to the Surface of the Cranium, in the same manner as the Periosteum adheres to the Bones in the other parts of the Body; but it is more firmly connected at the Sutures and Foramina than elsewhere; and so much more firmly in Children than in Adults, that, in separating it from the Cranium, it is apt to bring along with it some of the Fibres of the Bone to which it is attached.—In the Adult, the separation of the Bone from the Membrane is less difficult, in consequence of many of the Fibres being obliterated.

The inner Surface of the *Dura Mater*, which is remarkably smooth, is in close contact with the Brain, but adheres only where the Veins go into the Sinuses,—and is lubricated by a Fluid discharged through its Vessels, which guards the Brain from danger, according as it may be affected by the different states of Respiration.

The *Dura Mater* serves as a defence to the Brain, and supplies the place of a *Periosteum* to the inside of the Bones of the Cranium; giving nourishment to them,—as is evident from the numerous drops of Blood which appear after removing the Skull-cap.

From the inner side of the *Dura Mater*, *Processes* are sent off, which divide the Brain into certain parts, and serve to keep it steady; viz.

I. The *FALX*, *Septum Cerebri*, or *Superior Longitudinal Process*, which is formed by a doubling of the *Dura*

Mater, and is situated between the Hemispheres of the Brain. Tab. LX. *g, h, i, k, l, m*.—Tab. LXVIII. *y, z, v, w*.

It begins at the middle of the Sphenoid Bone, and *Crista Galli* of the Ethmoid Bone, and runs along the upper and middle part of the Head, adhering first to the Frontal, then to the joining of the Parietal, and afterwards to the middle of the Occipital Bone.

In its passage, it becomes gradually broader, extends from the Cranium to near the *Corpus Callosum*, and terminates behind in the middle of the Tentorium.

It runs from behind forwards in a straight direction, and has some resemblance in shape to a *Sickle* or *Scythe*, from which circumstance it has obtained the name of *Falx*.

Between the under edge of the *Falx* and Base of the Cranium, there is a large space, of an oval form, occupied by that part of the Brain which is common to the two Hemispheres. Tab. LX. *a, m, m*.

The *Falx* supports the Tentorium, and prevents the two sides of the Brain from pressing upon each other.

II. The *TENTORIUM CEREBELLI*, or *Transverse Septum*, or *Lateral Processes* of the *Dura Mater*. Tab. LX. *n, o, p, q, r, s, t*.

The *Tentorium* is continued laterally from the *Falx*, is connected behind to the inner Transverse Ridges and Grooves of the Occipital Bone, and at the fore and outer edges to the Ridges and great Angles of the Temporal Bones, and terminates at the Posterior Clinoid Process of the Sphenoid Bone.

Between the middle and inner edges of the Tentorium and posterior Clinoid Process of the Sphenoid Bone, there is a large Notch, or *Foramen Ovale*, where the Cerebrum and Cerebellum are united, or where the *Tuber Annulare* is chiefly situated. Tab. LX. between *a*, and *n*.

The Tentorium keeps the *Falx tense*, and forms a *Floor* or *Vault* over the Cerebellum, which prevents the Cerebrum from pressing upon it.

III. The *FALX MINOR*, or *Septum Cerebelli*, which is placed between the Lobes of the Cerebellum. It descends from the under and back part of the *Falx* and middle of the Tentorium, adheres to the inferior Longitudinal Spine of the *Os Occipitis*, and terminates insensibly at the edge of the *Foramen Magnum* of that Bone, Tab. LXVIII. *q*.

Besides the Processes of the *Dura Mater* already described, there are four of inferior consideration, two of which are situated at the sides of the *Sella Turcica*, and two at the edges of the *Foramina Lacera*. Tab. LX.

Several

Several other Processes pass out at the different openings of the Cranium, to be connected to the Pericranium, or to accompany the Spinal Marrow and Nerves.—These of the last description shall be afterwards taken notice of.

The *Arteries* of the Dura Mater are derived chiefly from the External Carotids, and partly from the Internal Carotids and Vertebrales. Tab. LVIII.

The *Veins* of this Membrane are of two kinds, Tab. CXXVII. Fig. 1. Fig. 2.—One set of them, like the Veins in other parts of the Body, accompany the Arteries;—the others are termed *Sinuses*, and differ from Veins only in this, that their Transverse Sections are of a triangular Figure, and that they are inclosed in a doubling of the Dura Mater, which is so tense over them, as to be little affected by the pressure of the surrounding parts.

In the bottom of the Sinuses are *small Transverse Cords* termed *Chordæ WILLISII*, which may add a little to their strength, and assist in preventing them from being too much distended.

The Sinuses serve to carry the Blood from the Brain, and convey it to the Veins of the Neck; for which purpose they are properly fitted, their Covering from the Dura Mater giving them strength, and their frequent communications preventing congestion.

The Principal SINUSES are,

I. The *Superior Longitudinal Sinus*, which begins at the Crista Galli of the Ethmoid Bone, runs along the upper edge of the Falx, becomes gradually larger in its progress, and terminates in the lateral Sinuses. Tab. LIX. E, E.—Tab. LX. *b, i, k.*—Tab. LXVIII. *u, v, v.*

II. The *Torcular Herophili*, or *Fourth Sinus* of the Ancients;—the term *Torcular* applied from a supposition that the Blood is squeezed in this Sinus as in a Wine-press.—It is chiefly formed of the Vena Galeni, runs between the Falx and Tentorium, and terminates with the former sinus in the beginning of the lateral Sinuses. Tab. LX. *u, w, x.*—Tab. LXVIII. *r, s.*—Tab. LIX. G.

III. The *two Lateral Sinuses*, which are formed by the Longitudinal and Torcular Sinuses. They run in depressions of the Occipital and Temporal Bones, first transversely, then in a winding direction downwards, and terminate at the Base of the Cranium, in the beginnings of the internal Jugular Veins. Tab. LX. *y, z.*—Tab. LIX. H, H.

Besides the Sinuses mentioned above, several others of less consideration will be pointed out in the particular description of the Veins.

The *Nerves* of the Dura Mater are so very minute, that they have not as yet been distinctly traced; and it is found to possess very little sensibility in the sound state.

Upon the side of the Superior Longitudinal Sinus, and

contiguous parts of the Brain, there are *numerous small Granulations*, of a *whitish* colour, called *Glandulæ PACCHIONI*.

Besides these Granulations, there are others of the same name, of a *Fleshy* colour, situated on certain parts of the outer Surface of the Dura Mater, and frequently projecting so much as to form deep pits in the Skull. Tab. LVIII. C, C.—Tab. VIII. Fig. 2.

The nature of these Granulations is still unknown.—By some they have been supposed to belong to the Lymphatic System.

The TUNICA ARACHNOIDEA, named from its cob-web appearance, is an exceedingly thin, tender, and transparent Membrane, in which no Vessels have been hitherto observed.

It is spread uniformly over the Surface of the Brain, inclosing all its Convolution, without insinuating itself between any of them.

At the upper part of the Brain, it adheres so closely to the subjacent Coat by fine Cellular Substance, that it can scarcely be separated from it; but in different parts of the Base of the Brain, particularly about the Tuber Annulare and Medulla Oblongata, it is merely in contact with the Membrane under it, and may readily be raised from it by the assistance of the Blow-pipe.

The Tunica Arachnoidea, like the Cuticle, covers and defends the parts under it.

The PIA MATER, named from its tenderness, is somewhat of the nature of the former Covering, but is extremely Vascular. Tab. LXI.—Tab. LXX. Fig. 2.

It envelopes the Brain in general, enters double between all its Convolution, and lines the different Cavities called *Ventricles*.

It serves to contain and support the Vessels of the Brain, and allows them to divide into such minute parts, as to prevent the Blood from entering the tender Substance of this Viscus with too great force.

The *Arteries* of the Pia Mater are the same with those of the Brain, and are derived from the Internal Carotids and Vertebrales.

The *Veins* differ in no respect from those of the other Viscera, excepting in this, that they do not accompany the Arteries.

The Brain is divided into *Cerebrum*, *Cerebellum*, *Tuber Annulare*, and *Medulla Oblongata*.

CEREBRUM.

The *Cerebrum*, or *Brain*, properly so called, is situated in the upper part of the Cranium, which it completely fills.

It is divided into two halves, termed *Hemispheres*, which are separated from each other by the Falx. Tab. LXI. C, D.

Each of the Hemispheres is of an *oval form*, or they somewhat

somewhat resemble an Egg cut longitudinal into two equal parts. The inner sides are flat, the upper and outer parts convex, and the under Surface irregular.

The under Surface is divided into *two Anterior, two Lateral, and two Posterior Lobes, or Processes.*

The *Anterior Lobes* are situated in the fore-part of the Base of the Cranium. Tab. LXIX, A, A.

The *Lateral or Middle Lobes* are lodged in the Fossæ formed by the Temporal and Sphenoid Bones. Tab. LXIX. C, C.

The *Posterior Lobes* are placed over the Cerebellum, and are separated from it by the Tentorium. Tab. LXIX. D, D.

Between the Anterior and Lateral Lobes, there is a *Furrow* formed by the Anterior Clinoid Processes of the Sphenoid Bone, which has been termed *Fossa, or Fissura Magna* SYLVII. Tab. LXIX.

The Surface of the Brain is divided into many turnings or windings, termed *Circumvolutions*, which run in various directions, and are of different sizes and lengths on different parts of the Brain. Tab. LXI. Tab. LXV.

The *Circumvolutions* are every where connected to the Pia Mater by an infinite number of small Vessels,—called by RUYSCH, *Tomentum Cerebri*,—which run into the Substance of the Brain; as may be readily seen, upon separating the *Circumvolutions* a little from each other.

Between the Hemispheres, a white Substance is observed, called *Corpus Callosum*, from its being a little firmer than the rest of the Brain. It goes across the Brain, under the Falx, and is merely a continuation of the Medullary Substance; running horizontally, and joining the two sides of the Hemispheres to each other. Tab. LXX. Fig. 5. E.—Tab. LXII. I, I.

In the middle of the *Corpus Callosum* there is a longitudinal *Raphè*, with a Medullary Cord on each side, from which many Transverse Streaks issue. These Cords, like the *Corpus Callosum* itself, become gradually broader towards the Posterior Extremity. Tab. LXII. K, L, L.

An horizontal Section, a little above the middle height of the Brain, or upon a level with the *Corpus Callosum*, shews the division of the Substance of the Brain into outer and inner, or *Cortical* and *Medullary* parts.

The outer Substance is termed *Cineritious*, from its being of a greyish or ash colour,—though a little tinged with brown;—and *Cortical*, from its surrounding the inner part of the Brain, as the Bark does the inner parts of a Tree. Tab. LXII. C, C.

It is termed by some Authors *Glandular*, and by others *Secretory*, from a supposition that a Fluid was secreted in it.

The *Cineritious Substance* covers the Brain in general, and enters deep between its *Convolution*s, is of a soft consistence, and composed of numerous small Vessels carrying red Blood; but it is uniform, and without any appearance of a Fibrous Texture.

The inner Substance is termed *White* or *Medullary*, and is considered as giving Origin to the different Nerves. It has been by some called *Excretory*, having been supposed to be formed of hollow Tubes continued from the Vessels of the Cortical part; but no Cavities have ever been observed in the soft Fibres of which it is composed. Tab. LXIII.

It is greater in quantity, and somewhat firmer in texture, than the *Cineritious Substance*, with which it is so intimately connected, as to appear to be a continuation of it.—The soft Fibres or Streaks of the *Medullary Matter*, run in general in a parallel and transverse direction.

In many parts of the *Cineritious Substance*, *Medullary Matter* appears; and, on the contrary, in different parts of the *Medullary Substance*, *Cineritious Matter* is found; the two being frequently blended together in the form of Streaks. See MONRO on the Nervous System. Tab. VII.

The *Centrum Ovale* of VIEUSSENS. This is the *Medullary Substance* of the Brain, forming a kind of Nucleus, which is seen after removing the *Cineritious Substance*, and all the *Medullary* parts mixed with it, which lie between the Cortical *Convolution*s.

To obtain a proper view of the *Centrum Ovale*, the Nucleus ought to be cut in such a manner as to preserve the *Corpus Callosum*, and the same convexity with that of the general convexity of the Brain.

The *Centrum Ovale* forms an *Arch* or *Roof* over the two Lateral Ventricles; and the under part of this Roof, which is smooth and uniform, constitutes the upper part of these Ventricles.

VIEUSSENS considered the *Centrum Ovale* as the *Great Dispensatory of the Animal Spirits*.

The VENTRICLES of the Brain are four in number, two of which are called *Lateral*.

The Four Ventricles have their sides contiguous to each other, are chiefly formed of *Medullary Matter*, and are lined with a continuation of the Pia Mater, which differs, however, from that part of the Membrane covering the exterior Surface of the Brain, in having fewer Vessels dispersed upon it.

They are constantly moistened by a Fluid, which prevents their opposite sides from adhering to each other.

The Use of the Ventricles, as of many other parts of the Brain, is still unknown.

The *Lateral*, formerly called *Superior Ventricles*, are situated in the Hemispheres, one in each, and run at first horizontally in the same direction with the Hemispheres themselves. Tab. LXIII. H, U, S.

They are of an irregular form, lying under the *Centrum Ovale*, and have each three winding Corners, compared to Rams' Horns, which are therefore called *Cornua*.

The *Anterior Cornua* are separated from each other only by the *Septum Lucidum*. Tab. LXIII, H, H.

The

The *Posterior Cornua*, Tab. LXIII. between U and S, Tab. LXIII. X, X, X, called also *Digital Cavities*, are at a considerable distance from each other, but approach nearer at their pointed extremities; while the *inferior Cornua*, the beginning of which is seen, Tab. LXIII. U, left side, run downwards and forwards, and terminate in the Lateral Lobes of the Brain.

In each of the Posterior Cornua there is an Elongation, which terminates in a point, and which is called *Ergot* by the French, from its resemblance to the Spur of a Cock; or, *Hippocampus Minor*, from its similarity to, and connection with, the substance termed *Hippocampus Major*. Tab. LXIII. T.

In the fore part of the bottom of the Lateral Ventricles, are two large Eminences, called *Corpora Striata*, which become gradually narrower, and recede from each other at their posterior extremities. Tab. LXIII. G, G.

The *Structure* of these is Cineritious externally, and mixed with Medullary Striæ within, some of which form large Transverse Medullary Arches, and others run more in a straight direction.

Between the posterior parts of the Corpora Striata, are situated the *Thalami Nervorum Opticorum*, which have a roundish form and Medullary Surface, and are of a Striated appearance within, but the Striæ are less distinct than in the Corpora Striata. Tab. LXIV. F, F, &c.

Upon the surface of these Bodies, there are small *Eminences* or *Tubercles*, some of which are placed upon their superior, and others upon their inferior extremities.

The inner parts of the Thalami are flat and contiguous; and above, they are so closely connected as to form one continued Surface, called *Commissura Mollis* of the Optic Thalami. Tab. LXX. Fig. 9. Tab. LXIV. I.

The posterior parts of the Thalami turn downwards and outwards, after which they are elongated, to form the two white Cords, called *Tractus Optici*. Tab. LXIX. d, d. Tab. LXV.

In the Groove between the Corpora Striata and Thalami, there is a Medullary Band on each side, called *Centrum Semicirculare Geminum* of VIEUSSENS, or *Tænia Semicircularis* of HALLER, or simply *Tænia*. Tab. LXIV. E, E.

Over the Thalami is placed the *Choroid Plexus*, named from its being composed of a Chorus of Vessels and Membranes. It is a fine Vascular Web, consisting of small ramifications of Arteries and Veins, connected by the Pia Mater, and spread upon the Surface of the Thalami, and some of the adjacent parts. Tab. LXIII. Q, Q.

The Choroid Plexus frequently contains numerous round *Globules*, resembling Hydatids, which have been considered by some Authors as Lymphatic Glands.

Under the *Raphè* of the Corpus Callosum, is placed the *Septum Lucidum*, which, when viewed laterally, is observed to be broad before, curved at its edge, and to

become gradually narrower towards its posterior extremity. Tab. LXIII. I. Tab. LXVIII. O.

It is connected above to the Corpus Callosum, below to the Fornix, and forms a distinct Partition between the Lateral Ventricles.

It is composed of two Cineritious and Medullary *Laminae*, more or less separated from each other at their fore-part, by a small Cavity, called *Fissure*, or *Fossa* of SYLVIVS, or *Sinus* of the Septum Lucidum. It is considered by some as a fifth Ventricle. It does not, however, communicate with the other Ventricles, though in some Subjects it reaches a considerable way backwards, and, as well as the other Cavities of the Brain, has been found full of water in Hydrocephalous cases. Tab. LXIII. L.

Under the Septum Lucidum is placed the Substance which has been compared in shape to a *Vault* by the Ancients, and from that has obtained the name of *Fornix*. Tab. LXVI. P.

The *Fornix* is merely a continuation of the Corpus Callosum, and forms a sort of hollow Ceiling, with four *Pillars*, called *Crura*, or *Cornua* from their winding direction, of which there are two anterior, and two posterior.

The two *Anterior Crura* are short, run close together, and become enlarged at their inferior parts. Tab. LXIV. C.

The two *Posterior Crura* are long, at a considerable distance from each other, and form Curvatures which correspond with the course of the Inferior Cornua of the Lateral Ventricles. Tab. LXIII. M, M.

That part of the Crura Fornicis lying in the Inferior Cornua of these Ventricles, forms thin Borders getting the name of *Corpora Fimbriata*; but, according to the VIC D'AZYR, they are more properly termed *Tænia Hippocampi*, from being united with the great Hippocampus.

The Body of the Fornix is narrow anteriorly, and becomes considerably broader behind, where it is incorporated with the Corpus Callosum.

The under Surface of the posterior part of the Body of the Fornix, is impressed with numerous transverse and oblique Lines, which have been called *Psalterium*, or *Lyra*, from some resemblance they bear to the ancient musical instruments of these names.

The Body of the Fornix is joined above to the Septum Lucidum; and below, it is connected to the Thalami Optici by a Vascular Membrane, called *Tela Choroidæa*, which spreads over the Thalami, and unites the Choroid Plexus of the Lateral Ventricles. Tab. LXX. Fig. 7. F, F.

The PEDES HIPPOCAMPI, CORNUA AMMONIS, or GREAT HIPPOCAMPUS,—named from a supposed resemblance to these parts,—are two Medullary Eminences, which arise from the sides of the posterior extremity of the Corpus Callosum, and are situated in the inferior Prolongations

Prolongations of the Lateral Ventricles. Tab. LXIII. V, W.—Tab. LXIV. W, W.

They run through the whole extent of the Prolongations, first behind, then at the outer part of the Posterior Pillars of the Fornix, and are so intimately connected with them, that they have been considered by some Authors as forming part of the Pillars themselves.

They are small at their Origin, from which they continue to increase to their farther extremity.

Like the greater part of the Ventricles, they are covered externally with a Medullary Lamina;—internally, they are found to consist of Medullary and Cineritious Laminae, having a convoluted appearance.

At the inner edge of the Pedes Hippocampi, there is a *plaited, serrated, or indented Margin*, which, in the generality of Quadrupeds, is much larger, in proportion to the size of the Brain, than it is in Man. The resemblance, however, to the human kind, in the structure of this particular part of the Brain, is more striking in the Ape than in any other Quadruped.

In the bottom of the Lateral Ventricles, behind the anterior Crura of the Fornix, and before the meeting of the Choroid Plexuses of these Ventricles; below the anterior part of the Body of the Fornix, and over the fore-part of the Third Ventricle, there is a *HOLE* of an *oval form*, by which the Lateral Ventricles communicate freely with each other. Tab. LXVI. S.—Tab. LXVII. S. See MONRO'S *Obs. on Nerv. Syst.* 1783, and *Treatise on the Brain*, 1797.

After dividing and turning back the Fornix, another Communication from the above Passage is found, called *Foramen Commune Anterius, Vulva, or Iter ad Infundibulum*; but properly, *ITER AD TERTIUM VENTRICULUM*, or *Passage to the Third Ventricle*. Tab. LXIV. H.—Tab. LXVII. above V.

Between the Commissura Mollis of the Optic Thalami and Substance called *Pineal Gland*, there is a small Passage termed *ANUS*, or *Foramen Commune Posterius*, which has been supposed by some Authors to form a communication between the back part of the third Ventricle and Lateral Ventricles; but it is completely closed up by the Tela Choroidea, and also by the Fornix, which is intimately connected to this Membrane. Tab. LXX. Fig. 9. g.

The *THIRD VENTRICLE* is in form of a deep Fissure, placed between the inner ends of the Thalami Optici, having the Commissura Mollis of these Thalami situated above, the Crura Cerebri below, and the Bodies of the Thalami on each side. Tab. LXVII. P.

The *INFUNDIBULUM*, Tab. LXVI. U.—Tab. LXVII. Tab. LXVIII. is a Passage of considerable size, of a Cineritious and Medullary Structure, which leads downwards and forwards, gradually contracting, and becoming solid at its under end, where it terminates in the *Glandula Pituitaria*, and thus, contrary to the opi-

nion of the Ancients, preventing the passage of any Pituitous Fluid from it to the Nose.

The *GLANDULA PITUITARIA* is of an oval form, about the size of a Field-bean, lodged in the Sella Turcica, and surrounded by a doubling of the Dura Mater. Tab. LXVI. V.—Tab. LXVIII. 14.

On the outside, it is of a brownish colour, being formed of Cineritious Matter: It is whiter within, where it is mixed with Medullary Substance.

The Glandula Pituitaria was formerly supposed to absorb a Fluid from the Infundibulum, and transmit it to the Nose. It has been already mentioned, however, that the Infundibulum is impervious; and the real use of this Gland, as well as of the other Tubercles of the Brain, seems still unknown.

At the fore-part of the Third Ventricle, and immediately before the Anterior Crura of the Fornix, there is a white Medullary Cord, which runs transversely through the Corpora Striata, uniting these together, and having the name of *COMMISSURA CEREBRI ANTERIOR*. Tab. LXIV. uppermost D.—Tab. LXVIII. No. 4.

At the back part of the Third Ventricle, and under the root of the Pineal Gland, there is another Cord similar to the former, but shorter, called *COMMISSURA CEREBRI POSTERIOR*, Tab. LXIV. undermost D.—Tab. LXVIII. No. 9. The *Commissura Cerebri* assist in uniting the two sides of the Brain to which they are fixed.

From the under and back part of the Third Ventricle, there is a Passage which leads to the Fourth, under the name of *ITER AD QUARTUM VENTRICULUM, Canalis Medius, vel Aquæductus* SYLVII. Tab. LXVII. c.—Tab. LXVIII. No. 24.

After the posterior part of the Fornix, and the Tela Choroidea to which it adheres, have been removed, there appear at the back part of the Third Ventricle, behind the Thalami, and over the Iter a Tertio ad Quartum Ventricle, the *NATES* and *TESTES*, or *TUBERCULA QUADRIGEMINA*, and the *PINEAL GLAND*.

The *NATES*, or *Tubercula Quadrigenina Anteriora*, Tab. LXIV. M, M, are placed uppermost, and are of a rounder form than the *TESTES*, or *Tubercula Quadrigenina Posteriora*, Tab. LXIV. N, N, which lie immediately below the former. The Testes are of a white colour, and broader from one side to the other than from top to bottom.

A longitudinal Section shews the Tubercle to be covered externally with a thin Medullary Lamina, and to be Cineritious within.

In Man, they are more nearly of an equal size than in Quadrupeds, as in the Ox, Sheep, &c. in which the Nates are large, round, and of a brown colour, and the Testes small and long.

Over the *Nates*, and under the back part of the *Fornix*, is placed the *GLANDULA PINEALIS*, which is of a Cineritious

Cineritious nature, about the size of a Garden-pea, and of a Conoid figure; obtaining its name from its resemblance in shape to a *Pine* or *Fir-cone*. Tab. LXIV. L.

In consequence of its being always present, and seldom found in a diseased state, it has been celebrated by DES CARTES, as the *Seat of the Soul*.

The *Pineal Gland* is fixed at its root to the *Commisura Cerebri Posterior*, and sends out *two long Medullary Peduncles*, or *Foot-stalks*, to be fixed to the upper and inner side of the *Thalami*, and to the *Anterior Crura* of the *Fornix*. Tab. LXIV. K, K.

Near, or in the Substance of the *Pineal Gland*, small *Calcareous Concretions* are sometimes found, called, by SOEEMMERRING, *Acervulus Cerebri*, from their being generally found collected in a heap.

They do not appear to be the effects of disease; nor are they met with till after the age of Puberty.

CEREBELLUM.

The *Cerebellum* is situated in the *Inferior Fossæ* of the *Occipital Bone*, under the posterior Lobes of the *Brain*, and is separated from these Lobes by the *Tentorium*. Tab. LIX. I, I.—Tab. LXVI. under M. Tab. LXVIII.

It is somewhat of a roundish form, though a little broader from one side to the other than from before backwards, Tab. LXV. D, D.—Tab. LXIX. It is only about a fifth or sixth part of the size of the *Cerebrum*, and less complex.

It is divided behind by the *Falx Minor* into two Lobes or Hemispheres, but has no separation above like the *Brain*.

Its Surface is divided into numerous *Circumvolutions*, which form *Arches* in many parts, decussating each other at sharp angles.

The *Circumvolutions* run chiefly in a lateral direction, and are formed of *Laminæ*, with deep *Sulci* between them, into which, as in the *Brain*, the *Pia Mater* insinuates itself. This may be readily seen by making a puncture into the *Arachnoid Coat*, and blowing in Air, till it distend the *Cellular Substance*, and separate the *Coats* from each other.

It has two middle Eminences, called *Appendices Vermiformes*, from their resemblance to *Earth-worms*, one of which is situated anteriorly and superiorly, the other inferiorly and posteriorly. Tab. LXX. Fig. 9. c.

Each of the Lobes of the *Cerebellum* is again divided into *Monticuli* or *Lobules*, which have different names, according to their relative situations, connections with other parts, &c. They vary a little in different Subjects, but are easily distinguished from the direction of their *Convolutions*.

The Substance of the *Cerebellum* consists of *Cineritious* and *Medullary Matter*, as in the *Cerebrum*; but the *Cineritious* bears a greater proportion to the *Medullary* in the former than in the latter.

When the *Cerebellum* is cut in a vertical direction, the *Medullary part* is then found to bear a striking resemblance to the branching of the Shrub called *Arbor Vitæ*; from which circumstance it has obtained the name of this Shrub. Tab. LXIV. R, R.

When cut in slices nearly parallel to the *Base* of the *Brain*, the *Medullary Substance* appears in *Laminæ* corresponding to those of the *Surface* of the *Cerebellum*; and when cut to a considerable depth, there is, as in the *Cerebrum*, a *Centrum Medullare* uniting the *Lateral Lobes*.

Between the *Cerebellum*, the under part of the *Tuber Annulare*, and upper part of the *Medulla Oblongata*, the *Fourth Ventricle* is situated, which extends from the Eminences called *Testes* to the posterior inferior Notch of the *Cerebellum*. Tab. LXIV. O, T.—Tab. LXVI.—Tab. LXVII.

A little lower than the *Testes*, the *Ventricle* becomes wider, and forms an angle behind, from which again it contracts, and becoming narrower and pointed below like a writing-pen, has got the name of *Calamus Scriptorius*. Tab. LXIV. T.

Over the under end of the *Aquæductus SYLVII*, and upper part of the *Fourth Ventricle*, there is a thin *Medullary Lamina*, called *Valvula*, but properly *Velum VIEUSSENII*. Tab. LXVI. e.

At the sides of the *Velum VIEUSSENII* there are two *Medullary Tracts*, called *Processus ad Testes*, or *Columnæ Valvulæ VIEUSSENII*. Tab. LXIV. Q, Q.

The under end of the *Ventricle* is found to be shut up by its *Choroid Plexus*, which prevents any communication between this Cavity and that of the *Spine*.

UNDER SURFACE OF THE BRAIN.

Near the middle of the *Base* of the *Brain*, and between its *Lateral Lobes*, there are two small, round, white Bodies, termed *Eminentie Mammillares*, or *Corpora Albicantia*, *Medullary without*, and *Cineritious within*, mistaken by some Authors for *Glands*. Tab. LXV. L, L.—Tab. LXIX. H.

In the *Corpora Albicantia*, various *Medullary Strata* terminate, which come from different parts of the *Brain*.

Immediately before the *Corpora Albicantia*, is seen the *Infundibulum*, leading from the third *Ventricle*. Tab. LXIX. G.—Tab. LXV. M.

On the outside of the *Corpora Albicantia*, two large white Cords are observed, called *Crura*, or *Pedunculi Cerebri*, or *Crura Anteriora Medullæ Oblongatæ*, which arise from the *Medullary Substance* of the *Brain*, and gradually approach each other in their course, till they unite with the *Tuber Annulare*. Tab. LXV. F, F.

Their Surface is flat, and composed of distinct *Medullary Fibres*. Internally they are composed of a mixture of *Cineritious* and *Medullary Matter*, the former of which being of a darker colour at one particular part than

than in any other of the Brain, has been termed *Locus Niger Crurum Cerebri*.

Between the Crura Cerebri, and likewise between the Corpora Albicantia, there is a Cineritious Substance, called *Pons TARINI*, which joins these Bodies of the opposite sides together, and assists in forming the bottom of the Third Ventricle. Tab. LXV. between the two L's.

From the Medullary part of the Cerebellum, which forms the Trunk of the Arbor Vitæ, two white Cords arise under the name of *Crura Cerebelli*, or *Crura Posteriora*, or *Pedunculi Cerebelli*, Tab. LXV. C, C.—Tab. LXIX. O, O, which unite with the Crura Cerebri, to compose the *Tuber Annulare*, or *Pons VAROLII*, Tab. LXIX. P, P, so named from forming a Ring or Bridge over the Crura. This Ring is intimately incorporated with, and formed by, these Crura.

The *Tuber Annulare* is situated over the back part of the Body of the Sphenoid and Cuneiform Process of the Occipital Bone. Many transverse Streaks run on its Surface, and it is divided into two lateral parts by a longitudinal Depression, occasioned by the situation of the Vertebral Artery. Tab. LXIX.—Tab. LXVIII. No. 23. No. 27.

At the fore and back parts of the Tuber, are the *Foramina Cæca*, *Anterior et Posterior*, the former placed between the Third, and the latter between the Sixth Pair of Nerves. These two Foramina penetrate only a little way at the edges of the Tuber, and receive a Plexus of Vessels.

The Substance of the Tuber is intermixed with a considerable quantity of Cortical Matter, formed into *Striæ* running in different directions.

Continued from the Tuber, there is a large Substance in form of an inverted Cone, which extends to the Foramen Magnum of the Occipital Bone, under the name of *Medulla Oblongata*. Tab. LXIX. R, V.

Upon the Surface of the Medulla Oblongata, two small Eminences appear, which run longitudinally, and contiguous to each other, and, from their shape, have the name of *Corpora Pyramidalia*, or *Eminentie Pyramidales*. Tab. LXIX. T.

Between the Corpora Pyramidalia, there is a deep *Fissure*, into which the Pia Mater penetrates, and where Blood-vessels pass into the interior part of the Medulla.

At the outside of the former Eminences, are two others, somewhat of the figure of Olives, from which they are termed *Corpora Olivaria*, or *Eminentie Olivares*. Tab. LXIX. U, U.

More externally than these, are other two Eminences, less evident than the last, which have been described by some Authors under the name of *Corpora Pyramidalia Lateralia*.

The Medulla Oblongata is divided into two lateral

Portions, by an anterior and posterior Fissure. These two Portions are formed of Medullary Matter without, and a large proportion of Cineritious Matter within, joined together by Medullary Fibres. Tab. LXIX. S, T.—Tab. LXV. G, G.

The BRAIN is the GRAND AND PRIMARY ORGAN OF SENSE with which the Mind is supposed to be most immediately and intimately connected, and from which the Nervous Influence is found, by experiment, to be communicated to all the other parts of the Body.

ORIGIN of the NERVES.

The Nerves arise from the Medullary parts of the Brain, some in solid Cords, others in separate Threads, which afterwards unite into Cords, and have their names in numerical succession, according to their situations,—beginning anteriorly.

The *First*, or *Olfactory Pair of Nerves*, arise from the back part of the anterior Lobes of the Brain, and run towards the Crista Galli of the Ethmoid Bone, over which each forms a brownish-coloured Bulb, from whence numerous small Nerves are sent off. Tab. LXIX. a, b, c.

The *Second Pair*, or *Optic Nerves*, are the continuations of the Thalami Optici. They are united immediately before the Infundibulum, and form an intimate intermixture of parts, and again separate, previous to their passing into the Orbits. Tab. LXIX. d, e, f.

The *Third Pair* arise by numerous Threads, which are soon collected into Trunks. Tab. LXIX. g, g.

The *Fourth Pair*, which are the smallest Nerves of the Body, arise behind the Testes, and have a long winding course. Tab. LXIX. h, h.

The *Fifth Pair*, which are the largest Nerves in the Brain, have each an anterior small, and a posterior large Fasciculus, arising from the sides of the Tuber Annulare. Tab. LXIX. i, i.

The *Sixth Pair* arise from the beginning of the Medulla Oblongata, where it joins the Tuber Annulare. Each of the Nerves of this Pair has a small Thread at its inner part. Tab. LXIX. k, k.

The *Seventh Pair* arise from the beginning of the lateral parts of the Medulla Oblongata, and are divided on each side into a *Portio Mollis*, and *Portio Dura*. Tab. LXIX. l, m.

The *Eighth Pair* arise by small Fasciculi from the Corpora Olivaria. Tab. LXIX. n, o.

The *Ninth Pair of Nerves* also arise by small Fasciculi a little below the former, from the Corpora Pyramidalia. Tab. LXIX. p, p.

The Origin of the Nerves are described at greater length in Vol. III.

TABLE

TAB. 58.



Δ Εϋφε σελ

T A B L E LVIII.

Gives a View of the DURA MATER ; the INTEGUMENTS being turned down, and the Upper Part
of the SKULL removed.

A, A, The cut edge of the cranium.
B, B, The course of the superior longitudinal finus.
C, C, C, Small pits, and scattered fibres of the dura mater, commonly occupied by the *Glandulæ Pachioni*.
D, D, Part of the dura mater which covers the right hemisphere of the brain.

E, E, Depressions between the convolutions of the brain appearing through the dura mater.
F, F, F, The convolutions of the brain appearing through the dura mater.
G, The principal artery of the dura mater, dividing into branches, which have corresponding furrows in the skull.
H, I, Branches from the trunk G.

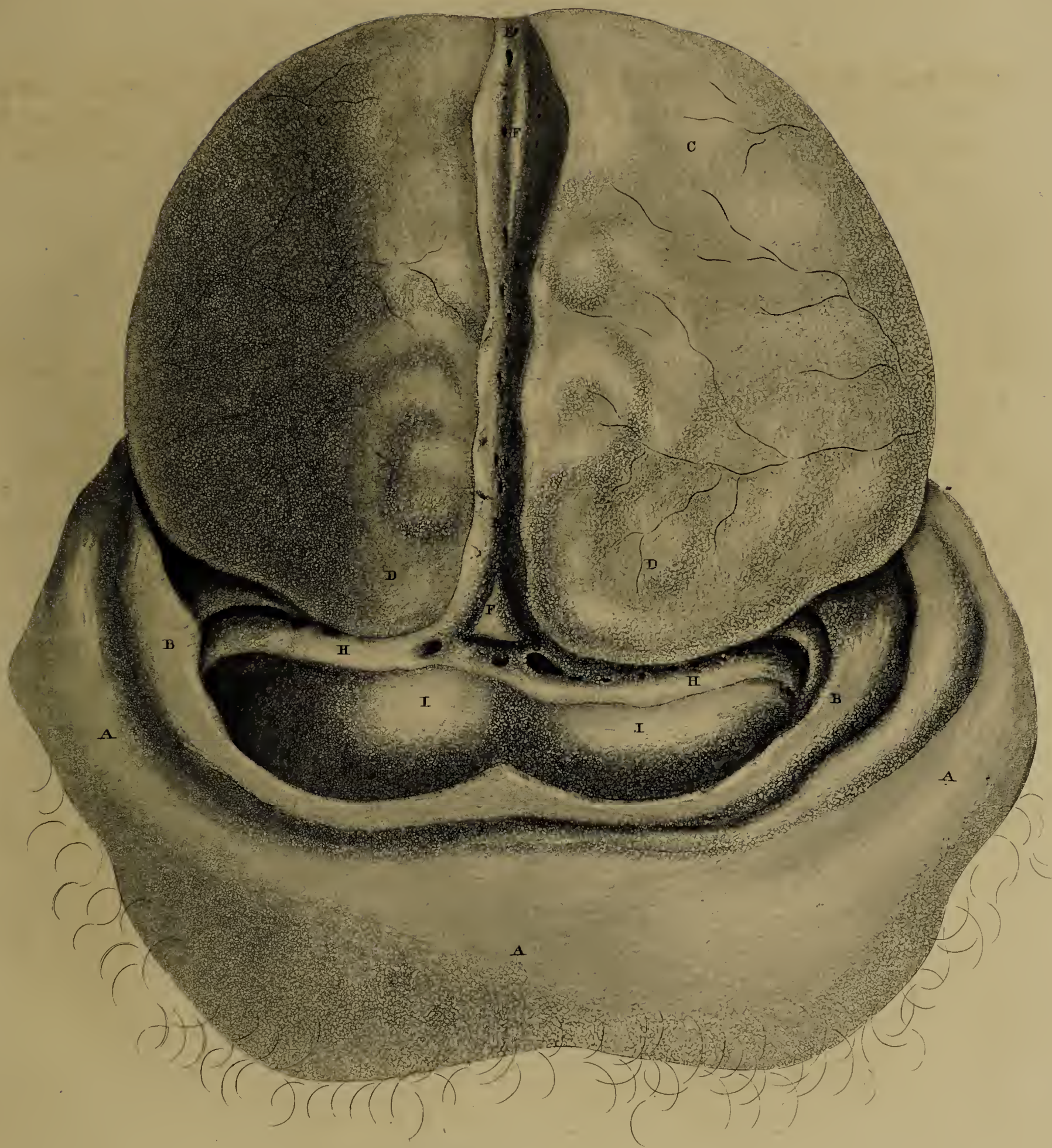
T A B L E LIX.

In this Figure the INTEGUMENTS of the Superior Part of the HEAD are cut and turned down, and the SKULL-CAP removed, to exhibit the BRAIN covered by the DURA MATER, with its Principal Sinuses laid open. The View is taken from the Upper and Back Part. The Figure is the Reverse of the Drawing from which it was taken.

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- | | |
|--|---|
| <p>A, A, A, The integuments of the upper part of the head, reflected.</p> <p>B, B, The cut edge of the bone, near the base of the cranium.</p> <p>C, C, The upper, and,</p> <p>D, D, The back part of the two hemispheres of the cerebrum, covered by the dura mater; with some traces of the principal arteries of that membrane.</p> <p>E, E, The superior longitudinal sinus slit open, with the terminations of the superior cerebral veins.</p> | <p>F, F, Two small portions of the dura mater, where the sinus was split in this subject.</p> <p>G, The termination of the torcular Herophili, in the beginning of one of the lateral sinuses.</p> <p>H, H, The two lateral sinuses laid open, with the termination of the veins from the upper part of the cerebellum.</p> <p>I, I, The two lobes or hemispheres of the cerebellum, covered by the dura mater.</p> |
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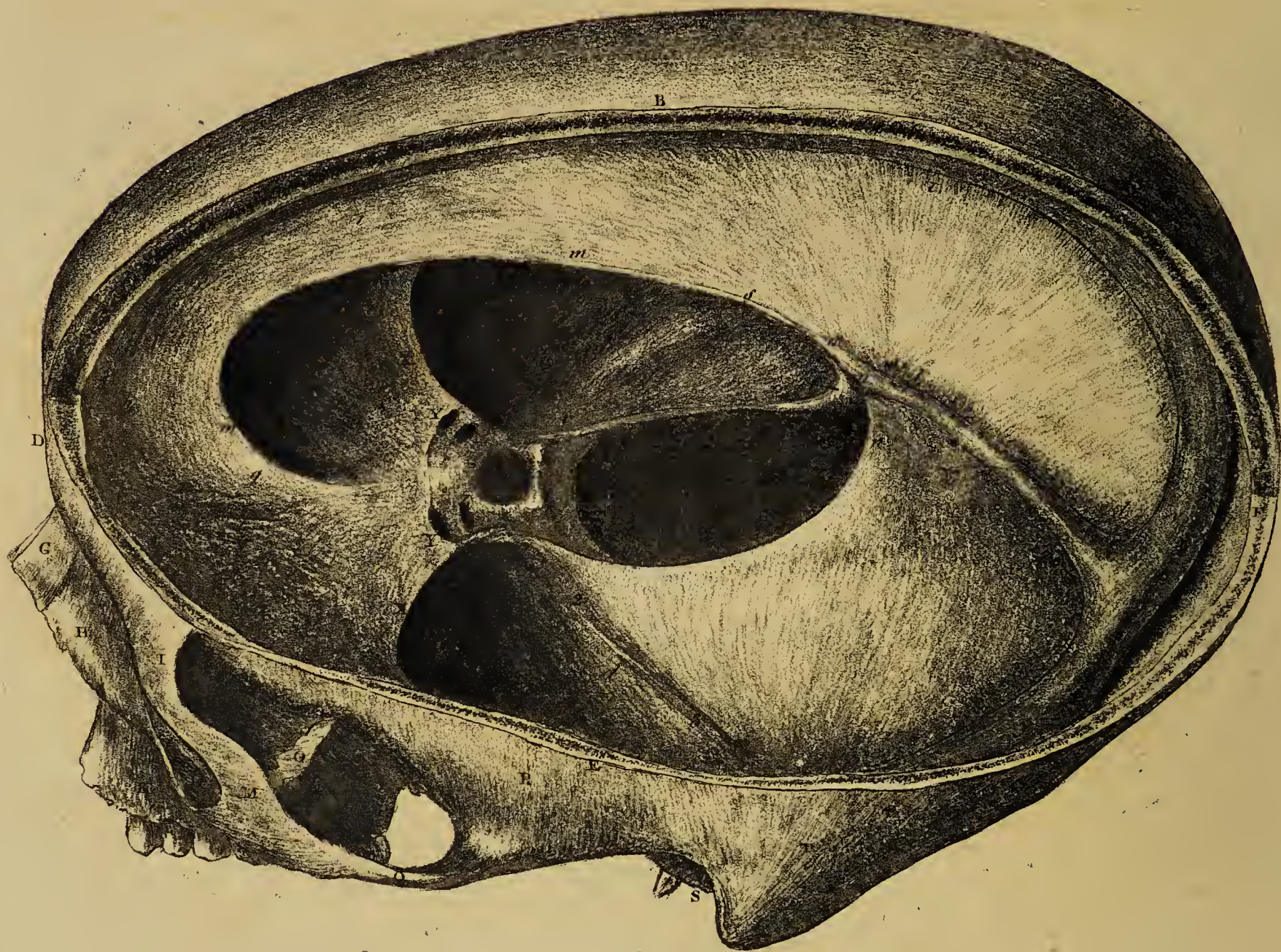
TABLE

TAB. 59.



Engraved by A. Fyfe.

TAB. 60.



T A B L E LX.

A SECTION of the SKULL, giving a View of the principal PROCESSES and SINUSES of
the DURA MATER.

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- | | |
|---|--|
| <p>A, B, C, The cut edge of the skull, a little to the left side of the falx.</p> <p>D, E, F, The left side of the skull, cut horizontally, a little above the tentorium.</p> <p>G, The os nasi.</p> <p>H, The nasal process of the superior maxillary bone.</p> <p>I, The outer orbital process of the os frontis.</p> <p>K, The alveolar arch of the superior maxillary bone.</p> <p>L, The under part of the orbit.</p> <p>M, The os malæ.</p> <p>N, The temporal plate of the sphenoid bone.</p> <p>O, The inferior, or external orbital fissure.</p> <p>P, The large tuberosity at the back part of the superior maxillary bone.</p> <p>Q, The zygoma.</p> <p>R, The squamous part of the temporal bone.</p> <p>S, The meatus auditorius, behind which is the styloid process.</p> <p>T, The mastoid process.</p> <p>U, U, The spine of the frontal bone ;</p> <p>V, W, Its orbital plates.</p> <p>X, X, The anterior clinoid process of the sphenoid bone.</p> <p>Y, Y, The foramina optica.</p> <p>Z, Z, A section of the internal carotid arteries.</p> | <p>a, The posterior clinoid process.</p> <p>b, b, The middle fossæ for the lateral lobes of the brain.</p> <p>c, The cuneiform process of the occipital bone.</p> <p>d, d, The anterior surface of the pars petrosa.</p> <p>e, The fossa in the occipital bone for lodging the right side of the cerebellum.</p> <p>f, The spine of the occipital bone.</p> <p>g, h, i, k, l, m, m, The falx.</p> <p>n, o, p, q, The left side of the tentorium.</p> <p>r, s, t, The right side of the tentorium.</p> <p>t, The under side raised and stretched by the falx.</p> <p>b, i, i, k, The superior longitudinal sinus ;</p> <p>v, Its termination.</p> <p>The backmost m, m, point out the inferior longitudinal sinus.</p> <p>u, w, x, The torcular Herophili, or fourth sinus.—u, The hole where the Vena Galeni entered to form this sinus ;</p> <p>x, Its termination in the lateral sinuses.</p> <p>y, The left lateral sinus.—The right is concealed by the falx.</p> <p>1. The seat of the left cavernous sinus.</p> <p>2. 3. The left petrosal sinus.</p> <p>4. The seat of the right inferior petrosal sinus.</p> |
|---|--|

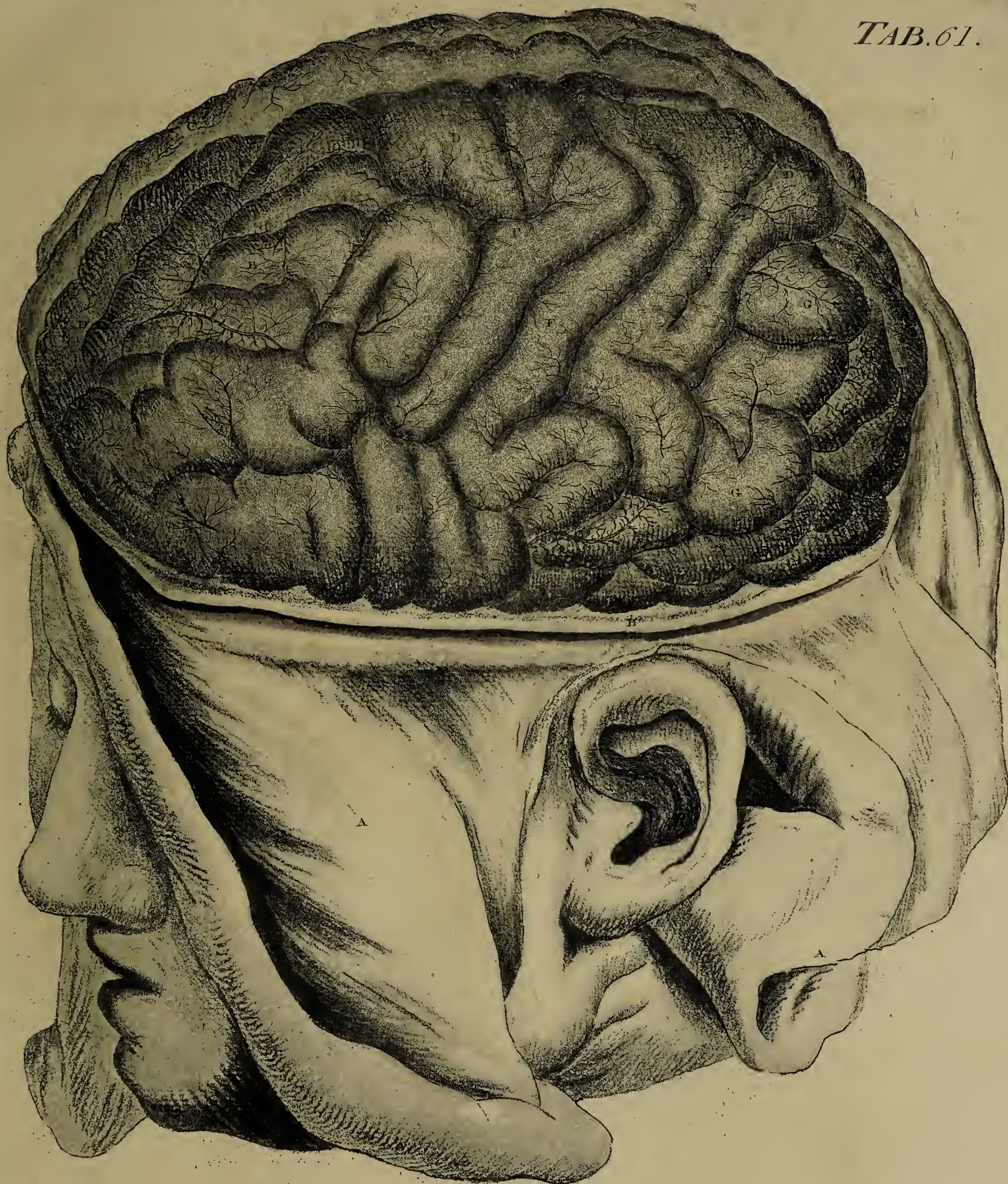
T A B L E L X I.

The CIRCUMVOLUTIONS of the BRAIN appearing through the PIA MATER, after the SKULL-CAP and DURA MATER have been raised.

-
- A, A, The skin and muscle which covered the cranium, turned down.
 B, B, The cut edge of the cranium.
 C, C, The right hemisphere of the brain.
 D, D, D, D, The left hemisphere.—Between the two hemispheres is the space which was occupied by the falx of the dura mater.
 E, E, The anterior circumvolutions of the brain, which were lodged in the cavity of the os frontis.—They are smaller than those which correspond with the parietal bone; nor do they resemble those on the opposite side of the head.
 F, F, F, The middle circumvolutions of the brain.—They run in an oblique direction, and are larger, longer, and straighter, than those in the other parts of the brain.
 G, G, The posterior circumvolutions, which are nearly of the same size with the former, but more convoluted and numerous.
 H, H, The posterior and inferior circumvolutions, smaller than the rest, and their disposition similar to that of the anterior circumvolutions.
 I, The appearance of an union of two circumvolutions into one; instances of which are frequently met with. Over the surface of the pia mater are seen small arteries, which, after being spread out on that membrane, plunge into the substance of the brain.

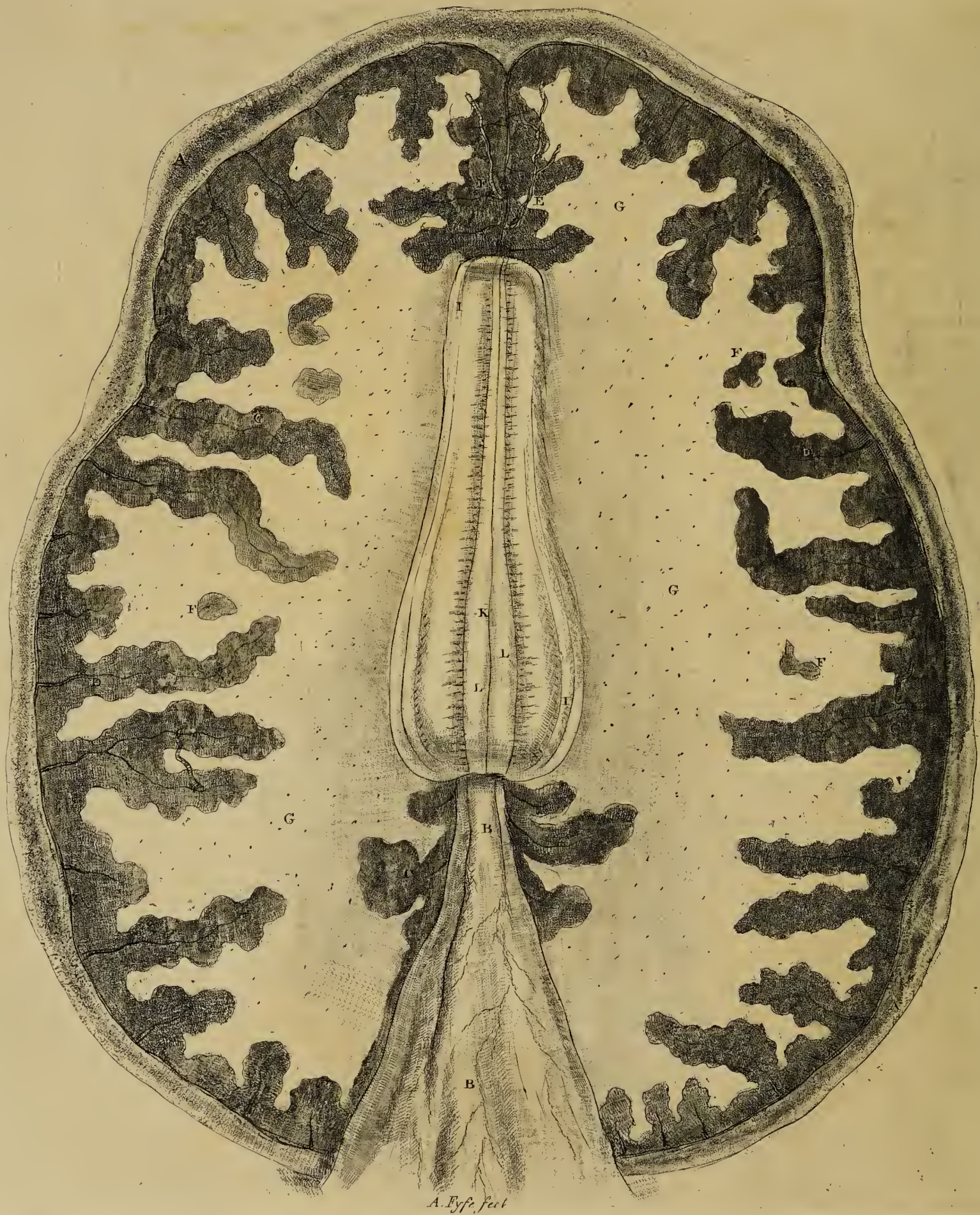
TABLE

TAB. 61.



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TAB. 62.



T A B L E LXII.

A View of a Transverse SECTION of the BRAIN, upon a level with the CORPUS CALLOSUM.

A, A, The cranium sawed at its greatest diameter.
 B, B, The dura mater turned back.
 C, C, C, The cortical part of the brain.
 D, D, The fissures between the circumvolutions.
 E, E, The arteriæ callosæ, which were placed upon the corpus callosum, and are now drawn forwards.
 F, F, F, Some portions of the cortical substance separated from the rest: They belonged to that part of the brain which was raised from this.
 G, G, G, The medullary substance, in which are seen the cut orifices of many blood-vessels.

H, A branch of an artery which sinks into the *Fossa Sylvii*.
 I, I, K, L, L, The corpus callosum.—K, A Raphè, or suture in the middle of the corpus callosum, on each side of which is a medullary cord L, L, broad behind and narrow before, which accompanies it through its whole length. On the outside of L, L, transverse lines are seen, which run under the medullary cords, are connected to them, and pass from one hemisphere of the brain to the other, so as to assist in forming the Raphè.

TABLE

T A B L E LXIII.

A deeper SECTION of the BRAIN than that shewn in the former Table.—The CORPUS CALLOSUM is removed, to obtain a View of the LATERAL VENTRICLES.

-
- A, A, The cut edge of the cranium.
 B, B, The frontal sinuses.
 C, C, Their openings into the nose.
 D, D, The fissures between the circumvolutions.
 E, E, The medullary substance of the brain, with numerous small dots, which represent the orifices of cut arteries.
 F, The fissure which separates the two anterior lobes of the brain.
 G, G, The corpora striata rounded and large anteriorly, and diminishing towards the posterior part, where they terminate, each in a point.—Ramifications of blood-vessels are seen upon them, which pass under the fornix, and terminate in the Vena Galeni.
 H, H, The anterior cornua of the lateral ventricles, of the same form with the anterior extremities of the corpora striata.
 I, The septum lucidum, which separates the lateral ventricles from each other.
 K, K, The two laminae of the septum lucidum, the internal part of which is formed of medullary, and the external of cineritious matter.
 L, The cavity or sinus of the septum lucidum.
 M, M, The two posterior crura of the fornix:—the anterior crura are hid by the septum lucidum.
 N, The back part of the corpus callosum joined to the fornix and septum lucidum.
 O, O, The posterior bandalettes of the posterior crura fornicis, which are very short, and join the pedes Hippocampi.
 P, P, The anterior bandalettes of the posterior crura fornicis, the origin only of which is here seen.
 Q, Q, The choroid plexuses of the superior or lateral ventricles; situated over the outer edge of the fornix, and upper part of the thalami nervorum opticornum.
 R, R, Two medullary bands, called Centrum Semicirculare Geminum of *Vicussens*, or Tænia Semicircularis of *Haller*; placed between the corpora striata and thalami nervorum opticornum.
 S, S, Posterior prolongations of the lateral ventricles.
 T, T, Projections in the posterior prolongations of the lateral ventricles, termed *Ergot*, each being in form of a cock-spur.
 U, Left side, the beginning of the inferior cornu of the lateral ventricle.—U, Right side, the continuation of the posterior crus of the fornix in the inferior cornu of the ventricle.
 V, The beginning, and,
 W, The termination of the pes Hippocampi in the inferior cornu of the right lateral ventricle.
 X, X, X, The inferior cornu of the lateral ventricle of this side, shewn by cutting deep into the substance of the brain.



TAB. 64.



T A B L E LXIV.

A Portion of the BRAIN cut horizontally, to shew Parts deeper seated than those represented in the former Table.—The CEREBELLUM is cut perpendicularly, from before backwards, and the Lateral Parts separated a little from each other.

-
- A, The middle of the brain, which surrounds the corpora striata.
 B, B, The corpora striata, with some blood-vessels upon their surface.
 C, A section of the anterior pillars of the fornix.
 D, The commissuræ anterior and posterior of the brain.
 E, E, The tænia femicircularis, or centrum femicirculare geminum.
 F, F, &c. The thalami optici covered with many vessels. At the fore-part, the letters F, F, point out also the anterior tubercles of the thalami.
 G, G, The bottom of the third ventricle.
 H, The origin of the infundibulum.
 I, The commissura mollis of the optic thalami, concealing part of the third ventricle.
 K, K, The peduncles of the pineal gland. Behind they cover part of the posterior commissure of the brain, but are distinct from it.
 L, The pineal gland, chiefly composed of cineritious substance.
 M, M, The tubercula quadrigemina superiora, or nates, over which the pineal gland is placed.
 N, N, The tubercula quadrigemina inferiora, or testes.
 O, A medullary lamina between the testes and valvula Vieussenii.
 P, P, The origin of the fourth pair of nerves.
 Q, Q, Two medullary tracts, called Proceßus ad Testes, Columnæ Valvulæ Vieussenii, &c.
 R, R, The medullary part of the cerebellum, called Arbor Vitæ.
 S, The cavity of the fourth ventricle, in the bottom of which there is a furrow, called Calamus Scriptorius.
 T, The end of the fourth ventricle and calamus scriptorius.
 U, U, The cerebellum.
 V, V, A perpendicular section of the brain.
 W, W, The cornua Ammonis, or great Hippocampi.
 X, X, The corpus fimbriatum, or band of the great Hippocampus.
 Y, Y, The choroid plexus.
 a, A principal branch of the deep cerebral artery, which comes from the vertebral one. This sends small branches inwards to the tubercula quadrigemina, pineal gland, and its peduncles. The principal branches run forwards to the thalami optici and choroid plexus; these frequently anastomose, and cross each other. A few branches run from the former to the tænia femicircularis, and back part of the corpora striata.
 b, b, The superior arteries of the cerebellum. The first part of these sends branches to the tubercula quadrigemina, and parts near them; and some small twigs run to the fourth ventricle, where they communicate with the superior arteries of the cerebellum. On the left side of the tubercula, the deep and superficial branches of the superior arteries of the cerebellum communicate freely.
 c, c, The continuation of the superficial arteries of the cerebellum. They spread over its surface, sink into its substance, and there communicate with the arteries which come from its under part.

T A B L E LXV.

The BRAIN inverted, on which are seen the CRURA CEREBRI et CEREBELLI;—the TUBER ANNULARE, and MEDULLA OBLONGATA;—the ARACHNOID COAT and PIA MATER being removed, in order to shew the General Direction of their MEDULLARY FIBRES.

A, A, The anterior lobes of the brain.

B, B, The lateral or middle lobes.

C, C, The posterior lobes.

D, D, The lobes, or hemispheres of the cerebellum;

a, a, Its superior and anterior lobules, called also Vermiform Processes of the Cerebellum.

E, E, The tuber annulare, the surface of which consists of medullary fibres, disposed chiefly in transverse bundles.

b, A depression where the basilar artery was placed.

F, F, The crura cerebri, composed externally of bundles of medullary fibres.

c, c, The principal crura cerebelli.

GHI, GHI, The medulla oblongata dissected, so as to shew that it is composed of two cords laid parallel to each other, and joined together by transverse fasciculi

of medullary fibres. G, G, The middle line where the cords are united. H, H, The corpora pyramidalia, which, in the natural situation, are contiguous to each other. I, I, The corpora olivaria.

K, K, The optic nerves cut horizontally, to shew the intermixture of their medullary substance. They are cut across near the foramina optica.

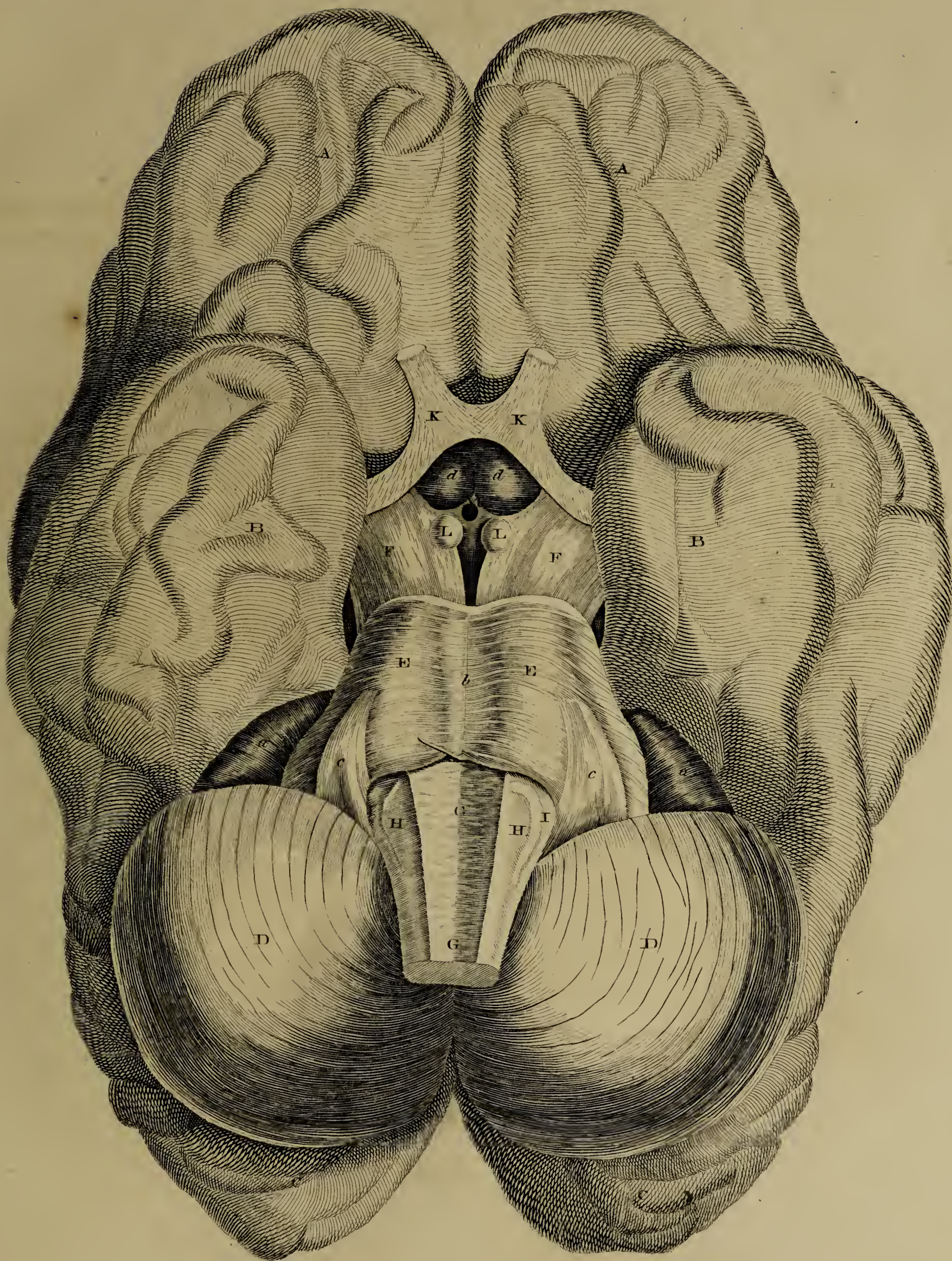
d, d, Cineritious substances intimately connected to the optic nerves, and furnishing some part of their medullary substance.

L, L, The corpora albicantia.

Between the corpora albicantia, there is a cineritious substance, called Pons *Tarini*, uniting them and the crura cerebri of the opposite sides.

M, A section of the infundibulum.

TAB. 65.





TAB. 66.



T A B L E LXVI.

The CRANIUM, BRAIN, and Nose, cut perpendicularly, close to the Left Side of the FALX
CEREBRI and SEPTUM NARIUM.

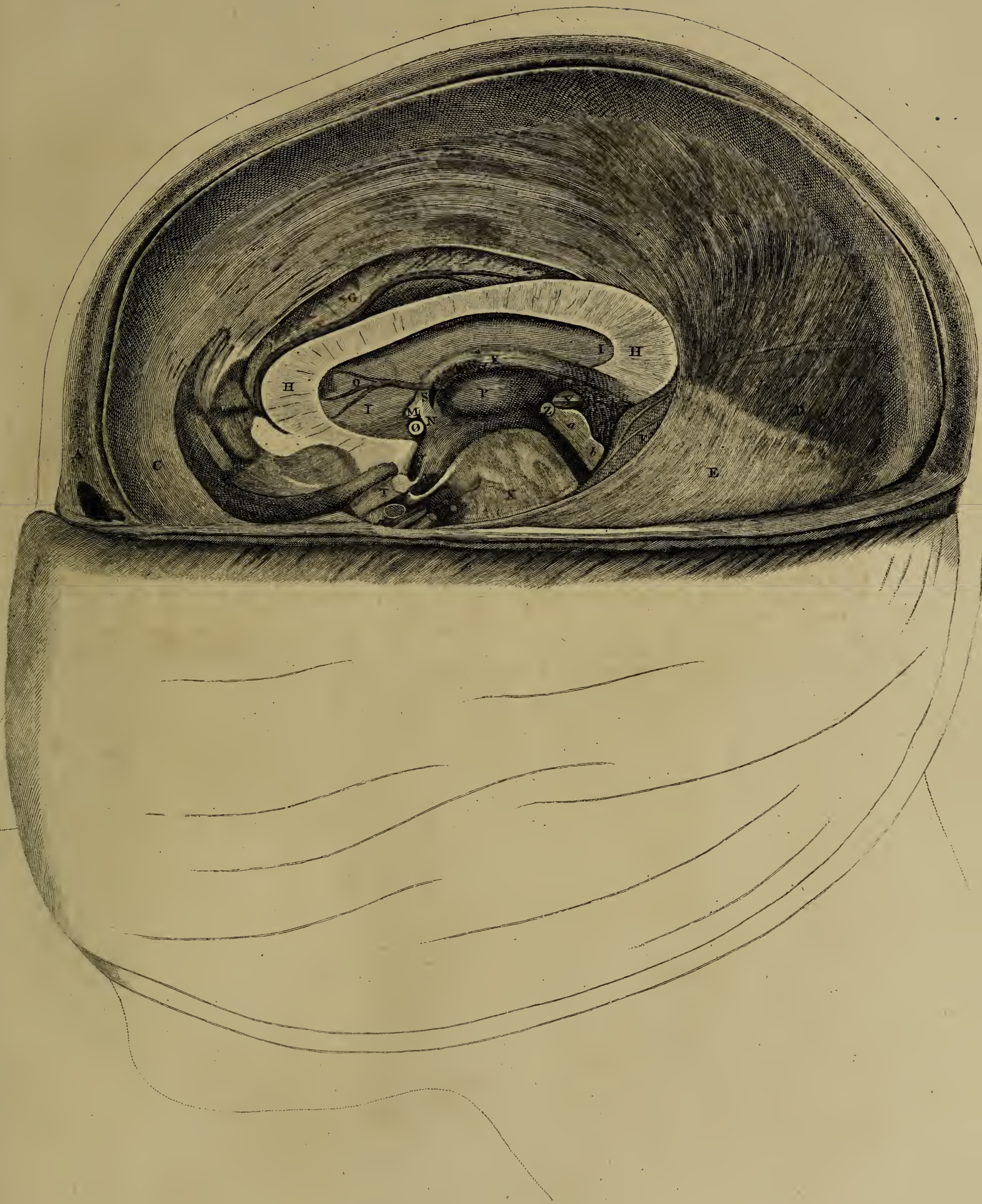
-
- A, A, A, A, A section of the cranium.
 B, Part of the left frontal sinus.
 C, Part of the left sphenoid sinus.
 D, The nasal lamella of the ethmoid bone.
 E, The vomer.
 F, A cartilage composing a large share of the septum narium.
 G, The opening from the right nostril into the throat.
 H, The roof of the mouth and the teeth, of the right side of the upper jaw.
 I, I, The cancelli of the cuneiform process of the occipital bone; from it, upwards to the sella Turcica, numerous and large cancelli were continued in this subject.
 L, L, L, The root of the falx, the rest being removed, to shew the convolutions of the inner side of the right hemisphere of the brain.
 M, M, Part of the tentorium cerebelli.
 N, N, A section of the corpus callosum.
 O, The septum lucidum.
 P, The body of the fornix.
 Q, Q, The two anterior crura of the fornix.
 R, A section of the commissura anterior.
 S, The passage by which the lateral ventricles of the brain communicate with each other, and with the third ventricle.
 T, The right side of the third ventricle, situated under the right thalamus nervi optici.
 U, The infundibulum, at the bottom of the third ventricle.
 V, The glandula pituitaria lodged in the sella Turcica.
 W, A section of the left optic nerve.
 X, A section of the left corpus albicans, behind the infundibulum.
 Y, Part of the choroid plexus.
 Z, The pineal gland, with two peduncles, one of which connects it to the side of the third ventricle, and the other to—a, which is a section of the commissura cerebri posterior.
 b, The iter ad quartum ventriculum.
 c, d, A section of the testes and testes.
 e, The valvula Vieussensii.
 f, The arbor vitæ of the cerebellum.
 g, The cavity of the fourth ventricle.
 h, The bottom of the fourth ventricle, shut by the vascular or choroid plexus and pia mater.
 i, A section of the tuber annulare.
 k, A section of the medulla oblongata.
 l, A section of the upper part of the spinal marrow.
 m, The basilar artery.

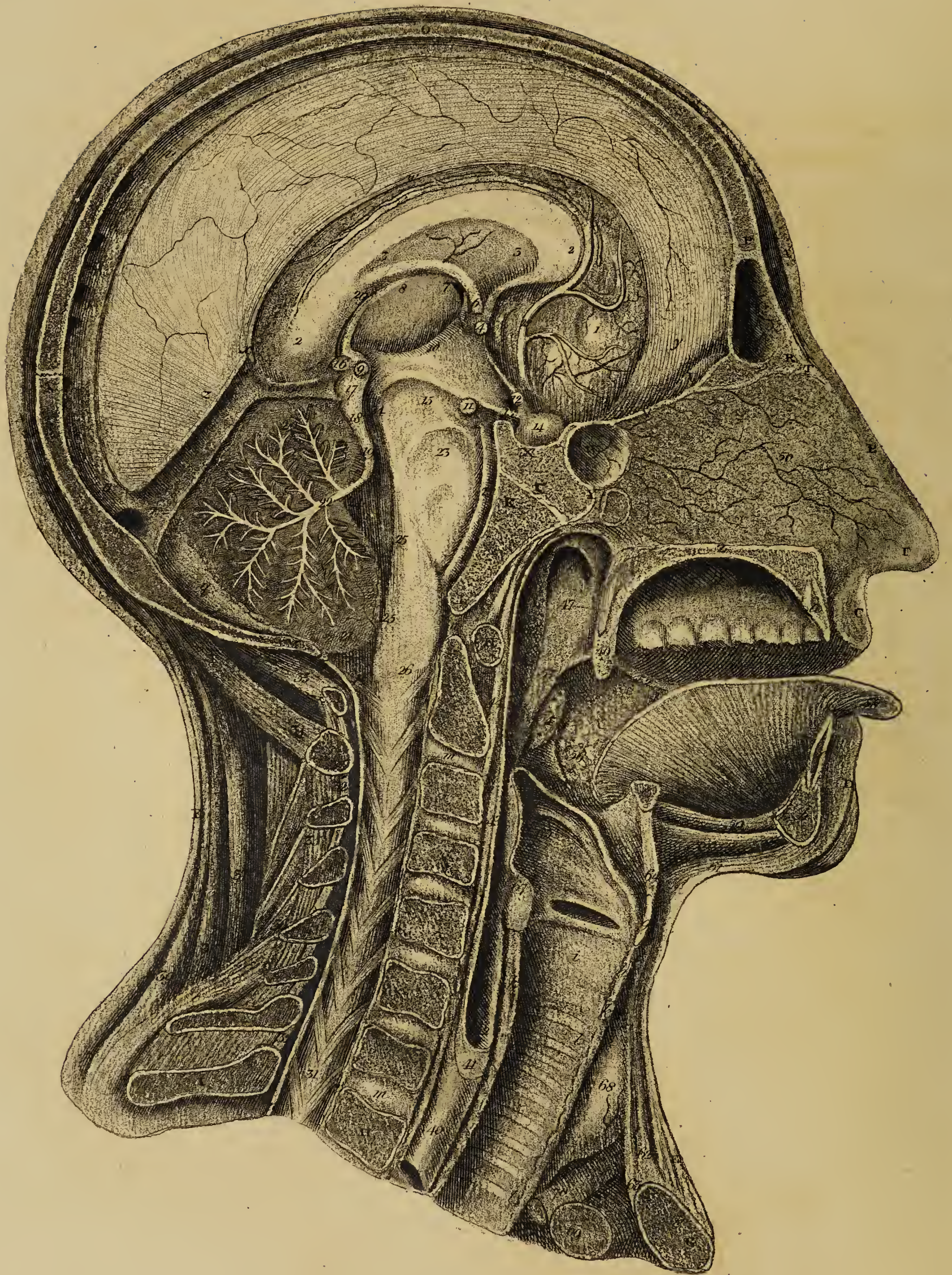
T A B L E LXVII.

A Perpendicular SECTION of the CRANIUM and BRAIN, at the Left Side of the FALX and SEPTUM LUCIDUM.

-
- A, A, The section of the cranium.
 B, A section of the left frontal sinus.
 C, The fore-part of the falx, fixed to the Crista Galli.
 D, The back part of the falx, fixed to the middle of the tentorium, E.
 F, The upper and anterior part of the cerebellum.
 G, Part of the inner side of the right hemisphere of the brain, with arteries upon its surface, from the anterior branch of the internal carotid.
 H, H, A section of the corpus callosum.
 I, I, The septum lucidum between the lateral ventricles.
 K, The middle part, or body of the fornix.
 L, A section of the left posterior crus of the fornix.
 M, A section of the left anterior crus of the fornix.
 N, The right anterior crus of the fornix.
 O, A section of the anterior commissura cerebri.
 P, The inner side of the right thalamus nervi optici, forming the right side of the third ventricle.
 Q, A vein running on the left side of the septum lucidum, to terminate in the choroid plexus, R.
 S, An oval hole under the anterior part of the body of the fornix, by which the two lateral ventricles communicate with each other, and with the third ventricle.
 T, A section of the right optic nerve, at the place where it unites with the left.
 U, A blind sac in the right side of the third ventricle, under the commissura anterior, and between the continuation of the corpus callosum and joining of the right optic nerve with its thalamus.
 V, The iter per infundibulum ad glandulam pituitariam, between the joining of the optic nerves with their thalami and the corpora albicantia; a section of the left of which is represented at W.
 X, A section of the tuber annulare.
 Y, The pineal gland, fixed by a peduncle on each side to the thalami nervorum opticorum, and by a middle peduncle to Z, the commissura cerebri posterior.
 a, A section of the nates of the left side.
 b, ————— testis of the same side.
 c, The iter a tertio ad quartum ventriculum.
 d, A section of the left internal carotid artery.

TAB. 67.





T A B L E LXVIII.

A Vertical SECTION of the HEAD and NECK, from before backwards, and a little to one side, so as to preserve in this view the parts in the middle, and common to each side of the HEAD.

A—F, The contour of the figure, and a section of the common integuments.
 G, The upper part of the sternum.
 H, H, The bodies of all the cervical vertebræ, and first vertebra of the back.
 I, I, The transverse processes of these vertebræ.
 K, L, The cuneiform process of the occipital bone.
 L, M, The foramen magnum of the occipital bone.
 N, The upper part of the occipital bone, and the lambdoid suture.
 N, O, The parietal bone. O, The coronal suture.
 O, R, The frontal bone.
 P, The plates of this bone separating, to form,
 Q, The frontal sinus of this side, divided from the other by a partition.
 R, The os frontis indented with the nasal bones.
 S, The ethmoid bone.
 T, The nasal bones.
 U, The Crista Galli of the ethmoid bone.
 V, The cribriform plate of the ethmoid bone.
 W, The right sphenoid sinus separated from the left by a partition covered with a vascular membrane.
 X, The sella Turcica.
 Y, The crista cuneiformis, or processus azygos.
 Z, The cuneiform bone joined to the occipital.
 Za, The osseous palate.
 a, One of the dentes incisores of the upper jaw.
 b, The lower jaw.
 c, One of the dentes incisores of the lower jaw.
 d, A small tubercle at the under and back part of the middle of the lower jaw, to which several muscles are fixed.
 e, The os hyoides.
 f—l, The larynx and trachea lined with their proper membrane.
 f, The point of the epiglottis.
 g, h, i, The thyroid cartilage.
 k, k, The cricoid cartilage.
 l, l, The trachea laid open, the cartilages of which are seen through the inner membrane.

m, m, The inter-vertebral cartilages.
 n, Ligaments binding the first and second vertebræ to the occipital bone.
 o, Ligament binding the first vertebra to the second.
 p, p, p, The portion of the dura mater which lines the spinal canal.
 q, The falx minor.
 r, s, The torcular Herophili;—r, is placed before the opening of the left lateral sinus.
 t, The opening of the vena Galeni into the torcular Herophili.
 u, v, v, The superior longitudinal sinus. At its upper and back part are seen the orifices of some of the veins of the brain.—u, The termination of the sinus in the beginning of the lateral sinuses.
 w, x, The inferior longitudinal sinus;
 x, The termination of the sinus in the torcular Herophili.
 y, z, v, w, The falx, in which the various directions of the fibres which compose it, and some blood-vessels, are seen.—y, The connection of the falx with the Crista Galli.—z, Connection with the tentorium.—v, The upper edge connected to the cranium.—w, The under edge of the falx, extending between the hemispheres of the brain to near the corpus callosum.
 1. 1. Part of the surface of the left hemisphere, covered with the pia mater and its blood-vessels.
 2. 2. The corpus callosum.
 3. 3. The septum lucidum.
 4. The anterior commissure of the brain.
 5. 6. The anterior crura of the fornix.—6. The right crus cut, to obtain a view of the left.
 6.—9. The continuation of the fornix, the back part of which is seen united with the corpus callosum.
 7. The passage by which the lateral ventricles communicate with each other and with the third ventricle. This opening is not represented in the original figure; but is added here from nature.

8. to a little below 10. The third ventricle, which, contracting, forms the infundibulum.
- Between 8. and 10. The left thalamus opticus, forming the left side of the third ventricle.
9. The posterior commissure of the brain.
11. One of the corpora albicantia.
12. The union of the optic nerves.
13. The under end of the infundibulum joining,
14. The glandula pituitaria.
15. The crura cerebri.
16. The pineal gland.
17. The nates.
18. The testes.
19. 20. 21. A section of the cerebellum.
22. The arbor vitæ, formed by the medullary parts of the cerebellum.
23. The tuber annulare.
24. 24. 25. 25. The fourth ventricle. The uppermost 24. is placed in the duct which leads from the third to the fourth ventricle. The undermost 25. is placed below the calamus scriptorius, or bottom of the fourth ventricle.
25. 25. 26. The medulla oblongata.
27. The basilar artery.
28. A branch of the internal carotid artery, which is distributed over the surface of the left hemisphere of the brain.
29. The choroid plexus, composed of small arteries and veins, seated above the optic thalami;
30. The vena Galeni, formed by the union of these veins.
26. 31. The spinal marrow, continued through the vertebræ of the neck. The nerves which are seen issuing from its anterior and posterior surface, and uniting into cords, are not much to be attended to in this figure.
32. Ligaments which occupy the intervals of the vertebræ from their bodies to their spinous processes, and connect them together.
33. The rectus capitis posticus minor.
34. ————— major.
35. The inter-spinales colli.
36. The inter-transversales colli.
37. The complexus.
38. The splenius.
39. The cucullaris.
40. The œsophagus.
41. The internal membrane of the œsophagus;
42. Its cavity.
- 42.—48. A section of the pharynx.
43. The cut edge of the pharynx.
44. Muscles placed between the pharynx and vertebræ.
45. The mucous glands of the pharynx.
46. The orifice of the Eustachian tube.
47. The velum palati.
48. The posterior opening of the left nostril.
49. The uvula, with its glandular substance and muscle.
50. The septum narium, covered with its vascular membrane.
51. The palate.
52. The anterior arch of the palate pulled forward with the tongue.
53. The posterior arch of the palate.
54. The amygdala.
55. The root of the tongue.
56. The mucous glands at the root of the tongue.
57. The genio-hyo-glossus, extending from the root to the tip of the tongue.
58. The apex linguæ.
59. The genio-hyoideus.
60. The anterior belly of the digastricus.
61. A portion of the platysma myoides.
62. The sterno-hyoideus.
63. The sterno-thyroideus.
64. The ligament which binds the os hyoides to the thyroid cartilage.
65. The epiglottis, and membrane on each side, which binds it to the thyroid and arytenoid cartilages.
66. The left ventricle of the larynx.
67. A section of the arytenoid muscles, and between that and the ventricle of the larynx, the arytenoid cartilage.
68. A section of the thyroid gland.
69. ————— arch of the aorta.
70. ————— subclavian vein.

TAB. 69.



T A B L E LXIX.

A View of the BASE of the BRAIN, and of the NERVES which take their Origin from it.

A, A, A, A, The anterior lobes of the brain.
 B, B, The division of the anterior lobes of the brain.
 CC, CC, The lateral lobes.
 D, D, The posterior lobes.
 E, E, A perforated part of the brain, for the passage of small arteries.
 F, F, A circumvolution on each side, corresponding to the cornua Ammonis.
 G, The infundibulum, supported upon the union of the optic nerves.
 H, The corpora albicantia.
 IKLM, IKLM, The cerebellum.—I, I, The superior and anterior lobules of the cerebellum, called also its superior and anterior Vermiform Processes.
 N, N, The crura cerebri. At their inner edge the cut extremities of blood-vessels are seen.
 O, O, The crura cerebelli.
 P, P, The tuber annulare.
 Q, An impression made by the basilar artery.
 R, S, T, U, U, V, The medulla oblongata.
 S, The fissure where the two lateral cords, of which the medulla oblongata is composed, can be separated some way from each other.
 T, The corpora pyramidalia.
 U, U, The corpora olivaria.
 V, The part where the medulla oblongata is said to terminate, and the spinal marrow to begin.
 a, a, The olfactory or first pair of nerves, which, con-

trary to the other nerves, converge in their passage under the brain.
 b, b, The roots of the olfactory nerves, from the back part of the anterior lobes, at the fissure of SYLVIIUS; each composed of three parts.
 c, c, The anterior bulbous extremities, composed of cineritious matter, mixed with streaks of medullary substance.
 d, d, The tractus opticus on each side, converging to form,
 e, The union of the optic nerves, partly concealed by the infundibulum.
 f, f, A section of the optic nerves, near their entry into the foramina optica.
 g, g, The third pair of nerves.
 h, h, The fourth pair of nerves.
 i, i, The fifth pair of nerves, which are composed of an anterior small, and a posterior large fasciculus.
 k, k, The sixth pair of nerves, each of which has a small thread at its inner side, separate from the trunk.
 l, m, l, m, The seventh pair of nerves.—l, The portio dura.—m, The portio mollis of the nerve.—Between the portio mollis and portio dura, are two small nerves which form WRISBERG's *Portio Media inter Communicantem Faciei et Nervum Auditorium*.
 n, o, n, o, The eighth pair of nerves, composed of, n, the nervus glossopharyngeus; and, o, the par vagum, formed of small fasciculi.
 p, p, The ninth pair, each formed of three fasciculi.
 q, q, The accessory nerves of the eighth pair.

TABLE

T A B L E LXX.

Additional VIEWS of the BRAIN and SPINAL MARROW.

FIG. 1.

See Tab. LX.

FIG. 2.

A View of the Upper Part of the BRAIN of a YOUNG PERSON, with the VESSELS minutely injected.

- A, B, The under part of the fore-head.
 C, A portion of the tunica arachnoidea, raised by inflation.
 D, The spinous part of the frontal bone, insinuating itself between the hemispheres of the brain.
 E, The groove between the two hemispheres of the brain, from which very numerous arteries emerge, and are connected by anastomoses, in an infinite number of places, with,
 F, F, The lateral arteries of the brain.
 G, G, G, The furrows or circumvolutions of the brain, covered by the pia mater and tunica arachnoidea, by which their depth is concealed.

FIG. 3.

Shews a portion of the pia mater A, A, covering the brain with its processes B, B, B, insinuating themselves within the circumvolutions of the brain, and winding along in a serpentine direction.—Numberless arteries, C, C, &c. are seen dispersed over it, which in the subject itself are still more numerous.

FIG. 4.

Shews the pia mater A, covering the cerebellum,—from a young subject. The same number of falciform processes B, B, B, are found in it, as there are circumvolutions in the cerebellum.—Only a few lateral branches of arteries are added; for, had the whole been represented, the falciform processes would have been obliterated. C, Shews the very short, delicate, and numerous small arteries, coming from the inner surface of the pia mater, and resembling a species of moss; of which the author of this Figure says he was the discoverer.

FIG. 5.

The BRAIN viewed on the Right Side, the DURA MATER being cut and turned down.

- AA, BB, The left hemisphere of the brain.
 BB, That part which is opposed to the falx.
 CC, DD, A transverse section of the right hemisphere, a little above the corpus callosum.
 CC, The cortical part, and intervening medullary portions.
 D, D, The medullary part.
 E, The corpus callosum.

F, F, F, F, A section of the dura mater into four parts, with its angles depending.

G, The medulla oblongata.

H, The cerebellum.

FIG. 6.

A Transverse SECTION of the BRAIN, upon a level with the LATERAL VENTRICLES, which are laid open.

- A, A, The anterior lobes of the brain.
 B, B, The posterior lobes.
 C, C, C, A section of the cortical part of the brain, and of the medullary portions which are intermixed with it.
 D, D, D, D, The medullary part.
 E, The part from which the corpus callosum is dissected.
 F, G, G, H, H, F, G, G, H, H, The lateral ventricles of the brain.
 G, G, G, G, The corpora striata.
 H, H, H, H, Choroid plexuses, composed chiefly of blood-vessels which arise from the lateral ventricles.

FIG. 7.

Is nearly similar to the preceding; but differs in this,—that the FORNIX and CHOROID PLEXUS are dissected from the Anterior Parts, and turned back.

- A, A section of the anterior crus of the fornix.
 B, The other section of the fornix turned back.
 C, C, The inferior part of the fornix turned back.
 D, D, The inferior part of the choroid plexus, also turned back with the fornix.
 E, E, Trunks formed by the veins of the choroid plexus.
 F, F, Continuation of the veins of the choroid plexus, passing under the fornix to the fourth sinus of the dura mater.
 G, A small portion of the cerebellum.
 H, H, The testes.
 I, I, The nates.
 K, The pineal gland.
 L, The third ventricle.
 M, M, The thalami nervorum opticorum.
 N, N, The corpora striata.

FIG. 8.

Gives a View of a SECTION of the BRAIN, nearly of the same depth with that of Fig. 7.—It also represents a Portion of the CEREBELLUM covered by the DURA MATER, with Part of the Large BLOOD-VESSELS which are injected,—and of the SPINAL MARROW.

- a, The fornix cut at its anterior crus, and turned back;
 b, Its anterior crus, divided into two.

c, c, The

FIG. 1. TAB. 70.

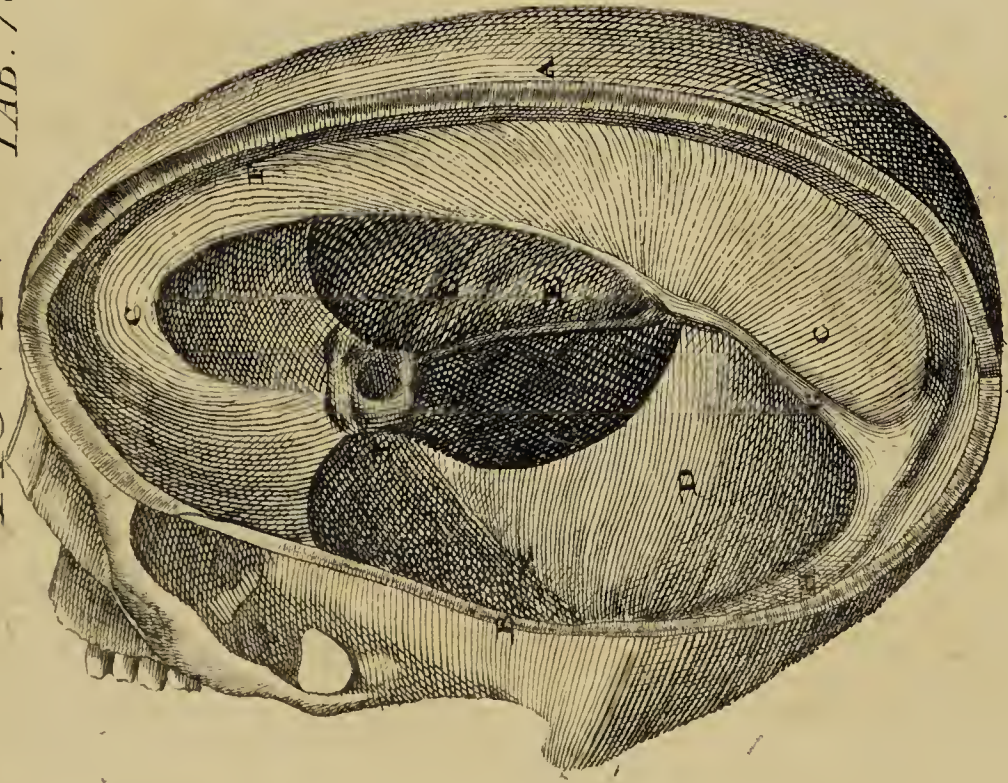


FIG. 2

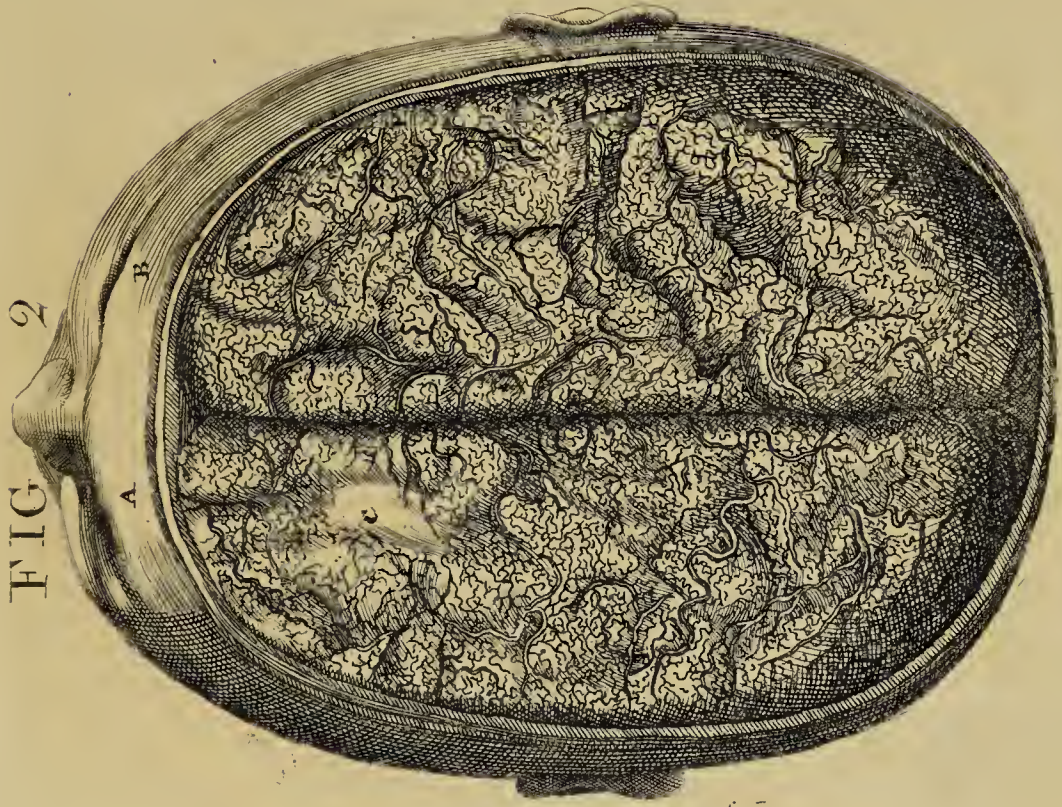


FIG. 3.



FIG. 4.

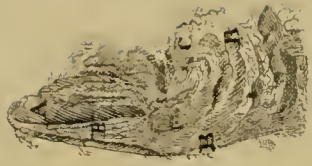


FIG. 5.

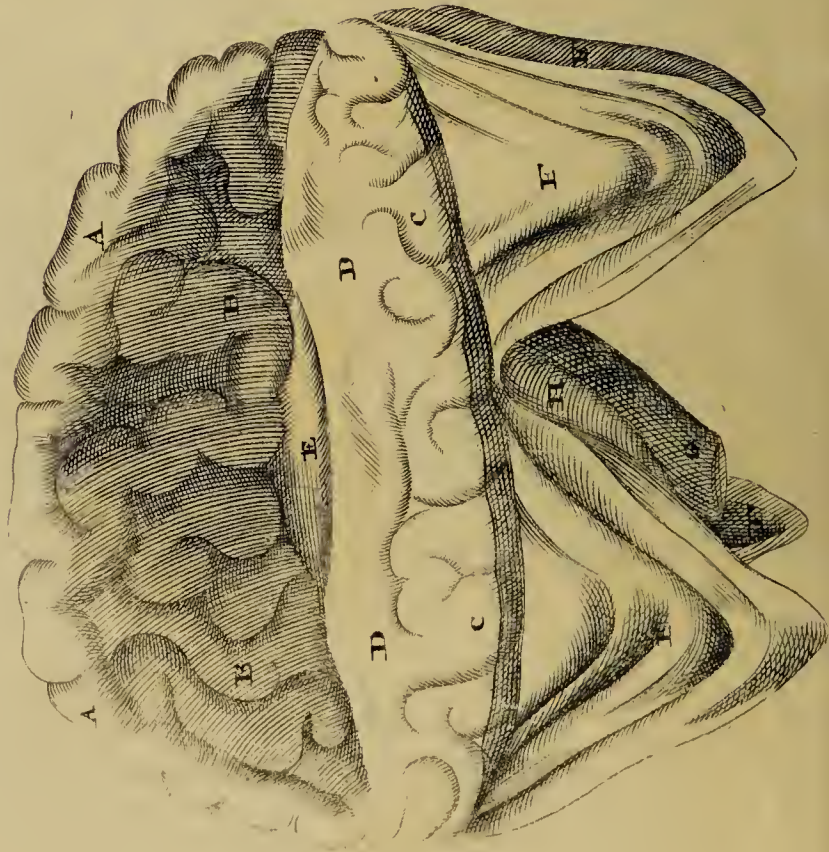


FIG. 6

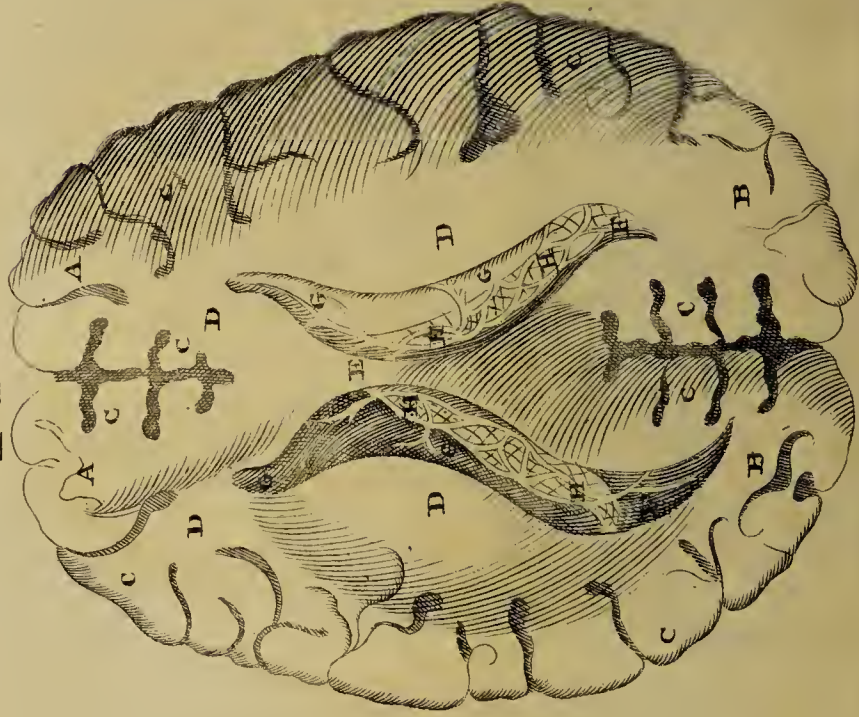


FIG. 7.

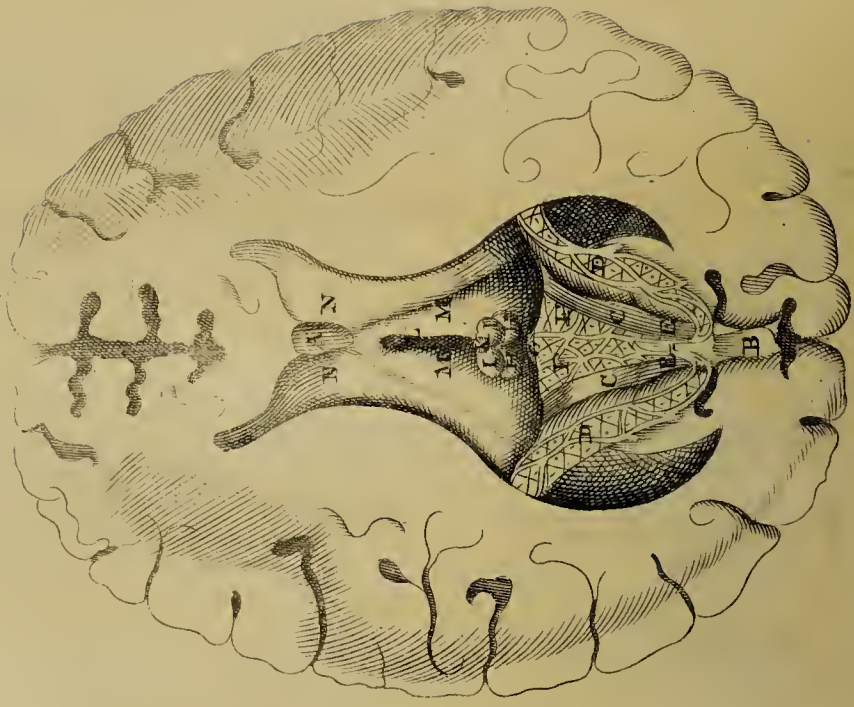


FIG. 9.

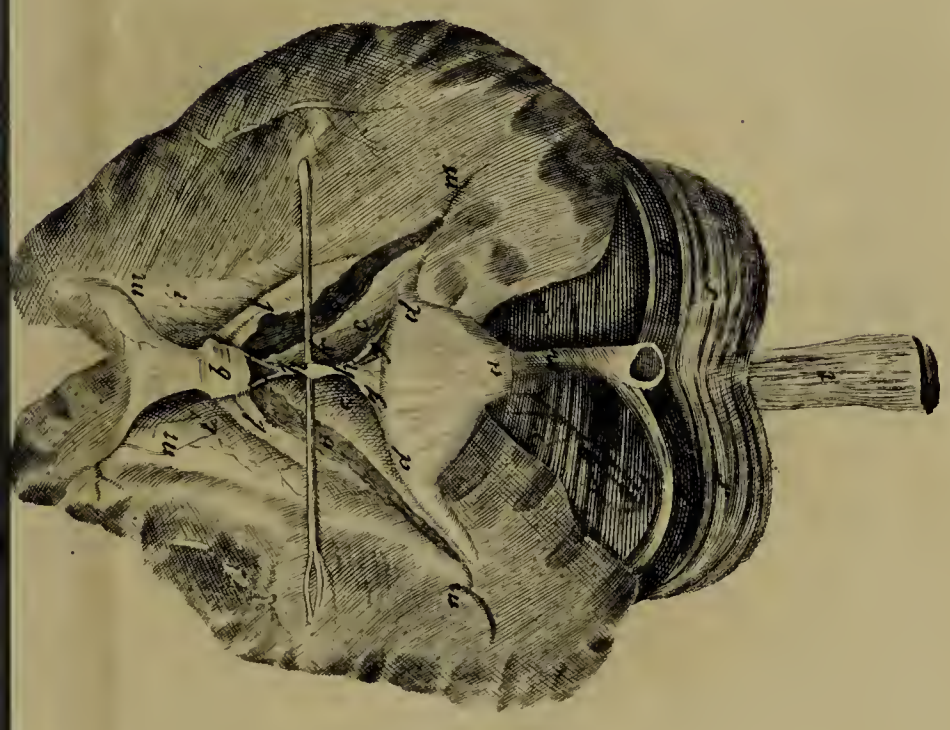


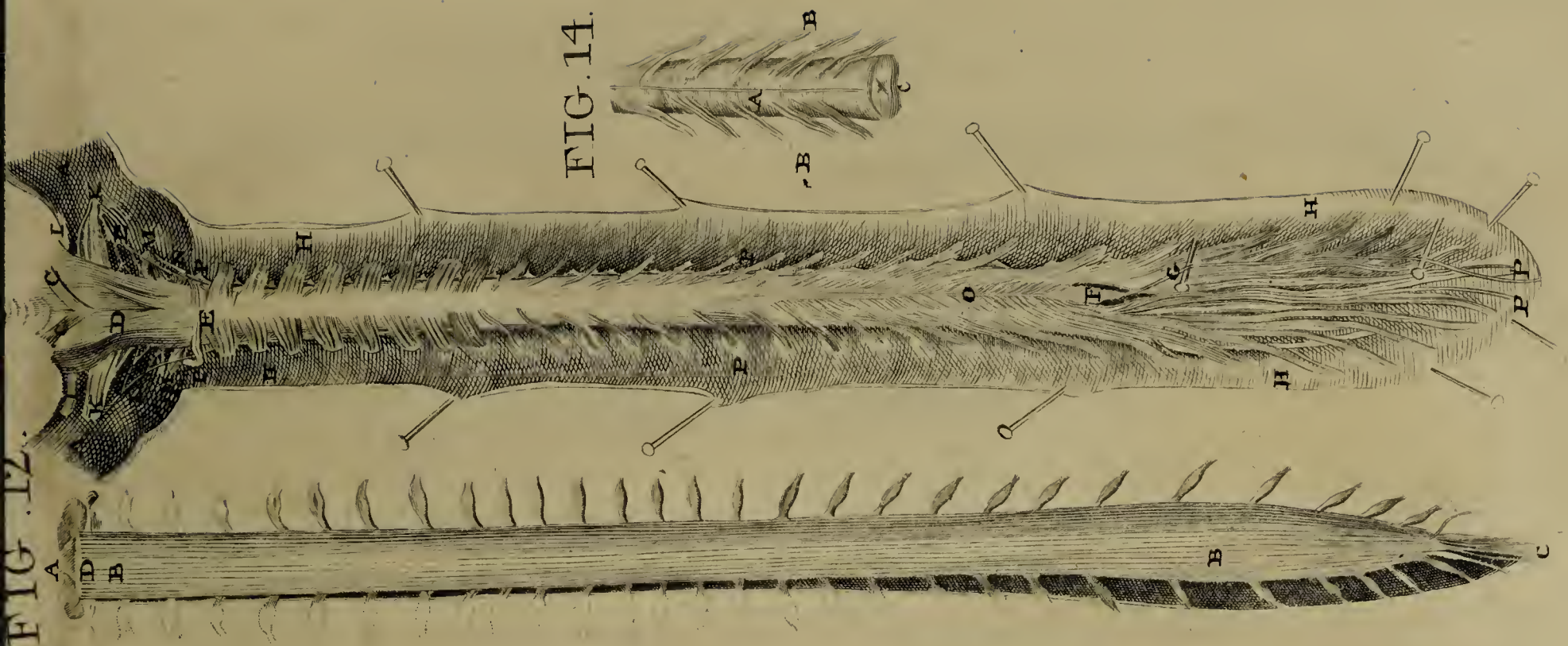
FIG. 10.



FIG. 11.



FIG. 14.



- c, c,* The thalami nervorum opticom.
d, d, The pedes Hippocampi.
e, e, The choroid plexus.
f, The part where the two plexus meet under the fornix.
g, g, Other parts of the choroid plexus, lying under the posterior crura of the fornix.
b, b, Large veins of the choroid plexus, supported by a probe, in their passage backwards to the fourth sinus of the dura mater.
i, i, The corpora striata.
k, The rima of the third ventricle, concealed by the large veins of the choroid plexus.
l, l, The centrum semicirculare geminum.
m, m, m, m, The centrum ovale of VIEUSSENS.
n, The fourth sinus of the dura mater.
o, The termination of the superior longitudinal sinus.
p, p, The lateral sinuses.
q, A large vein entering one of the lateral sinuses.
r, r, The cerebellum covered by the tentorium.
s, s, The under and back part of the cerebellum, covered by a continuation of the dura mater.
t, The spinal marrow.

FIG. 9.

A SECTION of the BRAIN, the FORNIX and CHOROID PLEXUS being removed, to shew the Connection of the THALAMI NERVORUM OPTICORUM; the Anterior and Posterior COMMISSURES; the PINEAL GLAND; the TUBERCULA QUADRIGEMINA; the VALVULA VIEUSSENSII, &c.

- a, a, a, a,* The cortical, or cineritious substance, which surrounds the whole of,
b, b, b, b, The medullary, or white substance of the brain.
c, c, The corpora striata, of an ashy colour.
d, d, The thalami nervorum opticom, of a white colour.
e, The anterior pillar, separated from the rest of the fornix, and turned forward, to shew the two short columns which support it, and the anterior commissure which unites them.
f, The anterior opening, common to the two lateral ventricles, and to the third ventricle.
g, The posterior opening, which is shut up by a vascular membrane and choroid plexus.
h, The pineal gland.
i, i, i, i, The tubercula quadrigemina, or nates and testes.
l, The large valve of VIEUSSENS.
m, m, The fourth pair of nerves.
n, n, The cerebellum, with blood-vessels running upon its surface.
o, o, The processus vermiformis.

FIG. 10.

Represents a deeper SECTION than Fig. 9. of the BRAIN of another Subject. The THALAMI NERVORUM OPTICORUM

are separated, so as to bring the Third VENTRICLE into view; and by a Vertical SECTION of the CEREBELLUM, the ARBOR VITÆ and Fourth VENTRICLE are seen.

- a, a,* The corpora striata.
b, b, The thalami nervorum opticom.
c, The anterior pillar of the fornix.
d, The third ventricle, at the anterior part of which is seen the beginning of the infundibulum.
e, The pineal gland.
f, f, The tubercula quadrigemina.
g, g, g, g, The two portions of the cerebellum.
h, h, The medullary substance of the cerebellum, commonly called the Arbor Vitæ.
i, i, k, k, The fourth ventricle.
k, k, The groove in the ventricle, called Calamus Scriptorius.
l, The extremity of the medulla oblongata.

FIG. 11.

Exhibits the BASE of the BRAIN, with Part of the SPINAL MARROW, and the BLOOD-VESSELS, which are injected with Wax.

- A, A,* The anterior lobes of the brain.
B, B, The lateral lobes.
C, C, The posterior lobes.
D, D, The cerebellum.
E, E, The vertebral arteries, where they pass between the first cervical vertebra and occipital bone.
F, F, The lateral sinuses.
G, The vertebral sinus of this side.
H, The dura mater of the right side, cut and turned back from the spinal marrow; on the left side it remains *in situ*.
a, The cut end of the infundibulum.
b, b, The corpora albicantia, behind the infundibulum.
c, c, The internal carotid arteries.
d, d, Communicating branches between the internal carotid and vertebral arteries.
e, e, e, e, Four principal branches of the vertebral arteries, which run to the back part of the cerebrum, and to the cerebellum.
f, Branches running off from the carotid artery.
g, The basilar artery, formed by the two vertebral arteries.
h, h, The trunks of the vertebral arteries.
i, i, The anterior spinal artery.
k, k, The crura cerebri.
l, l, The crura cerebelli.
m, m, The tuber annulare, or pons Varolii.
n, The corpus pyramidale of the right side.
o, The corpus olivare of that side.

FIG. 12. 13. 14.

Views of the Spinal Marrow. See these repeated and explained in VOL. III.

OF THE EYE.

The *Eyes*, which constitute the Organ of Vision, are situated in the Cavities of the Orbits, and are surrounded by several parts, some of which protect them from injury, and others assist in the performance of their various motions.

The *Orbits* are of a conical figure, situated in the fore-part of the Cranium, with their Apices behind, their Axes in an horizontal direction, and their Bases turned obliquely outwards.

They are formed of different Processes of the following Bones, viz.

The upper part of each Orbit, by the Orbital Plate of the Frontal Bone;—the inferior, by the Orbital Plates of the superior Maxillary and Malar Bones;—the internal, chiefly by the Orbital part of the Os Unguis and Pars Plana of the Ethmoid Bone;—the external by the Orbital Plates of the Sphenoid and Malar Bones;—the posterior, by the Sphenoid and Palate Bones;—and the anterior edge of the Orbit, by the Frontal, Superior Maxillary, and Malar Bones.

The Cavities of the Orbits are lined with Productions of the Dura Mater, which pass through the Foramina Optica and Lacera; and at the anterior edges of the Orbits, join the Periosteum of the Face, where they supply the place of Ligaments to the Palpebræ.

SUPERCILIA.

The *Supercilia*, or *Eye-brows*, which are peculiar to the Human Species, are the Arches of Hair situated upon the Superciliary Ridges of the Frontal Bone. The Hairs are placed obliquely, with their roots towards the Nose, and the Arches elevated a little above the rest of the Fore-head, by a considerable quantity of Cellular Substance lying under the Skin.

They are moved in different directions by the action of the Occipito-Frontalis, Corrugator Supercilii, and Orbicularis Palpebrarum.

They are intended partly for Ornament, and partly as Shades over the Eyes, thereby preventing them from being injured by extraneous Matter, or by too great a degree of light. They also assist in expressing the Passions of the Mind.

PALPEBRÆ.

The *Palpebræ*, or *Eye-lids*, are chiefly composed of a Doubling of the Skin inclosing part of the Orbicularis Palpebrarum, and of the Cartilages called *Tarsi*; and form Angles at their outer and inner extremities, termed *Canthi*, or *Corners of the Eye*.

The *Upper Eye-lid* is the one which moves principally in closing or opening the Eye; the under moving only when the Eye-lids are shut with more than usual force.

The *Motions* of the Eye-lids are performed by the action of the Orbicularis and Levator Palpebrarum.

The Eye-lids serve as Curtains or Veils, to defend the Eyes during Sleep. They likewise prevent them from being injured by extraneous objects, or by too much light. By their frequent motion, they increase the secretion of the Tears, apply them properly to the Surface of the Eye, and conduct what remains, after washing the Eye, to the Puncta Lacrymalia.

TARSUS.

This is a *thin Cartilaginous Arch*, situated in the edge of each Eye-lid; that in the upper one being considerably broader than the one below, and each broader at its middle than towards its extremities.

They terminate at a little distance from the inner Angle of the Eye.—Their edges are so placed, that when the Eye-lids are shut, a Groove is left next the Eye, by which the Tears are conveyed towards the Nose.

The *Tarsi* serve to keep the Eye-lids extended, allow them to be accurately applied to each other, and prevent them from being collected into folds.

GLANDULÆ SEBACEÆ, CILIARES, or MEIBOMIANÆ.

The last term is obtained from these Substances being described by MEIBOMIUS. They are placed between the Tarsus and lining of the Eye-lids, and are formed of a series of white Lines or Follicles, running in serpentine directions, which, when viewed through a Magnifier, appear like rows of pearls. From their Substance an Oily or Sebaceous Matter, resembling little Worms, may be readily squeezed out through the Foramina or Puncta Ciliaria, placed upon the edges of the Eye-lids.

The Matter of the Sebaceous Glands facilitates the motions of the Eye-lids, and prevents their Accretion during sleep.

CILIA.

The *Cilia*, or *Eye-lashes*, are stiff Hairs placed in the edges of the Eye-lids. Those of the upper Eye-lid are bent upwards, and are considerably longer than those of the under Eye-lid, which are bent in the opposite direction. In both Eye-lids, they are wanting near the inner Angle.

The

The Cilia prevent dust, insects, &c. from getting into the Eye, assist in moderating the quantity of light sent into it, and add to the beauty of the Face.

GLANDULA LACRYMALIS.

The *Glandula Lacrymalis*, called, till of late years, the *Glandula Innominata* GALENI, is situated upon the upper and outer part of the Eye, in a Hollow behind the outer end of the Superciliary Ridge of the Frontal Bone.—It is a Gland of the Conglomerate kind, of a yellowish colour, of an oblong form, and a little flattened, with one end pointing to the Nose, the other to the outer Angle of the Eye.

Besides the *Glandula Lacrymalis*, there is a Chain of smaller Glands, lying between it and the upper Eye-lid, and connecting them together.

In the direction of the smaller Glands, there are several Excretory Ducts,—described by DR MONRO, 1758,—which run nearly parallel to, but do not communicate with each other.

The Excretory Ducts, on account of their smallness, are not often seen, and are injected with difficulty. They terminate on the inner side of the Upper Eye-lid, near the outer Angle of the Eye and upper edge of the Tarsus.

The Use of the Lacrymal Gland is to secrete the Tears, which are spread over the Surface of the Eye by their own weight, and by the motion of the Eye-lids, for the purpose of preserving the delicacy of the Eye, and particularly the transparency of the Cornea.

PUNCTA LACRYMALIA.

The *Puncta Lacrymalia* are two small Orifices placed near the inner Angle of the Eye, one in the upper, the other in the under Eye-lid, at the extremity of the Tarsus, and opposite to each other.

Each Punctum is seated obliquely upon a little Eminence, and is surrounded with a Cartilaginous Circle, which keeps it constantly open.

The *Puncta Lacrymalia* are the Orifices of two small Canals, which run in the direction of the edges of the Eye-lids towards the side of the Nose, where they approach each other, and terminate together in the Lacrymal Sac.

The Tears which remain after moistening the Eye, are absorbed by the Puncta, in the manner of Capillary attraction, and are conveyed through their Ducts into the Lacrymal Sac by the impulse of the Eye-lids.

CARUNCULA LACRYMALIS.

The *Caruncula Lacrymalis* is a small Gland of a reddish colour, of the Conglomerate kind, situated between the inner Angle of the Eye-lids and Ball of the Eye; supplying Sebaceous Matter to this part of the Eye-lids;

and serving in particular to separate the *Puncta Lacrymalia*, and to direct the Tears to them while the Eye-lids are shut.

Minute Hairs are found upon the Surface of this body, serving to entangle small objects which get into the Eye.

VALVULA SEMILUNARIS.

The *Valvula Semilunaris* is a small doubling of the *Tunica Conjunctiva*, and lies between the *Caruncula Lacrymalis* and Ball of the Eye.

It is larger in the Ape and other Quadrupeds than in the Human Species, and still larger in Birds, in which, as well as in Quadrupeds, it is called *Membrana Nictitans*.

It is in form of a Crescent, the Horns of which are turned towards the *Puncta Lacrymalia*, and assists the *Caruncula* in conducting the Tears to the Puncta.

BALL OF THE EYE.

The *Ball, Globe, or Bulb* of the Eye, is of a spherical form, to collect the rays of light into a proper Focus, and is surrounded behind by a quantity of soft Fat, to allow the Eye and its Muscles to move with facility.

It is composed of Coats, Humours, Vessels, and Nerves, to be next described.

COATS.

TUNICA ADNATA.

The *Tunica Adnata*, or *Conjunctiva*, named from its connecting the Eye to the Orbit, is a Reflection of the Skin continued from the Eye-lids over the whole forepart of the Ball of the Eye.

It adheres slightly by means of Cellular Substance to the White of the Eye, but so firmly to the Cornea, as to be separated from it with difficulty.

It is so remarkably thin, that the colour of the subjacent parts appears readily through it.

Between this Coat and the White part of the Eye, there is a quantity of loose Cellular Substance, which is very Vascular, and is the common seat of *Ophthalmia*.

The *Tunica Adnata* supports the Ball of the Eye, prevents extraneous Bodies from getting to the back part of it, and forms a smooth Covering to lessen the friction between the Eye and Eye-lids.

CORNEA.

The *Cornea*, so called from its resemblance to Horn, is termed by many Authors *Cornea Lucida*, to distinguish it from the *Sclerotica*, which these Authors called *Cornea Opaca*.

It forms the anterior pellucid covering of the Eye, is more convex than the rest of the Ball, and is joined to the Tunica Sclerotica, like the Segment of a small Sphere to that of a larger one. The convexity, however, varies in different persons, so as to form a short or long sighted Eye, according as the Cornea is more or less prominent.

In a recent Subject, it is hard, dense, and transparent; but after maceration in water, it becomes soft and opaque, and may be readily separated, especially in young Animals, into different Lamellæ, the anterior of which is the continuation of the Tunica Adnata.

By a slight degree of putrefaction, it may also be separated from the Tunica Sclerotica.

In the Whale, the edge of the Cornea is received into a distinct Groove, formed by the Sclerotica.

In a sound state, the Cornea has no Vessels which carry red Blood, though such are frequently seen on it when the Eye is inflamed.

Its Nerves are too small to be traced; yet it possesses exquisite sensibility.

It collects the rays of light, and transmits them to the Eye, protects the tender parts within it, and contains the Aqueous Humour.

IRIS.

The *Iris*, so named from being in some Persons of different colours, is the only Coat of the Eye which possesses motion. It was considered as a continuation of the Choroid Coat, until described by ZINN, who shews that it is only connected to this Coat by the medium of the Ciliary Circle.

It is placed at a little distance from the Cornea, begins a small way behind the junction of that Coat with the Sclerotica, and, running across, it forms a Septum, a little convex anteriorly, and perforated in the middle by a Hole, called the *Pupil*, or *Sight* of the Eye; the former Term applied, because it represents objects no larger than a Pupilla or Puppet.

In the Fœtus, the Pupil is occupied by a Vascular Membrane, termed *Membrana Pupillaris*, which generally disappears between the seventh and ninth month of gestation.

Upon the back part of the Iris, there is a dark-coloured Pigment, considered by the Ancients as a posterior Layer of the Iris, and called by them *Uvea*, from its resemblance in colour to the Grape.

When the Paint is washed off, the Iris exhibits two sets of Fibres,—concerning which Authors have entertained various opinions,—one set in the form of Radii, the different colours of which give the diversity of colour to the Eye; the other Circular, surrounding the inner edge of the Iris, and considered by DR MONRO as the Sphincter Muscle of the Pupil.

The Iris has also many Blood-vessels, which are rendered evident by Injection; and is furnished with a

greater proportion of Nerves than almost any other part of the Body.

It floats in the Aqueous Humour, and is of such a nature, that upon exposure to a strong light, or when the Eye looks upon a near object, the diameter of the Pupil is diminished; and *vice versa*.

The different motions of the Iris are supposed to be excited by the sensibility of the Retina, and by the quantity of light which falls upon that Nerve.

The Iris serves to regulate the quantity of light sent to the bottom of the Eye.

TUNICA SCLEROTICA.

The *Tunica Sclerotica*, which is named from its hardness, is the largest and strongest Coat of the Eye, covering the whole Ball, excepting the parts occupied by the entrance of the Optic Nerve behind, and by the Cornea before.

It is so firmly fixed to the edge of the Cornea, that it has been considered by many Anatomists as a Continuation of the same substance; but it differs from the Cornea in the following particulars:—It is of a pure white colour; is formed of Fibres running in every direction, and closely interwoven with each other; is not divisible into Layers, and may be separated from it by art, as has been already mentioned.

It is thickest posteriorly, and receives a little tinge on the inner Surface, from the Choroid Coat, with which it is in contact.

It gives form and strength to the Eye, and supports the tender parts within it.

The Tendons of the four Recti Muscles of the Eye are fixed to the fore-part of the Tunica Sclerotica. These, or the Cellular Vaginæ covering them, have been supposed to give an additional whiteness to the Eye, and the part giving this whiteness has been termed *Tunica Albuginea*:—But the Sclerotic Coat is every where of a pure white, and can receive little additional brightness from any such covering.

TUNICA CHOROIDES.

The *Choroides* lies under the *Sclerotica*, and is connected to it by the Trunks of Vessels and Nerves which pass from the one Coat to the other, and also by a tender Cellular Substance, of a brown colour, which tinges the inner Surface of the Sclerotica.

It begins at the entrance of the Optic Nerve into the Eye, runs between the Sclerotica and Retina, nearly to the Crystalline Lens, where it is more firmly connected to the Sclerotic Coat than it is elsewhere, by means of the Ciliary Circle.

The *Ciliary Circle*, or *Ciliary Ligament* as it is called, is composed of a quantity of condensed shining Cellular Substance, which forms a white Ring connecting the fore-

fore-part of the Choroides, and the root or outer Margin of the Iris, to the Sclerotica.

The Choroid Coat is much thinner and more tender than the Sclerotic, and is one of the most Vascular parts of the Body, seeming at first sight to be entirely composed of Vessels.—The greater number of those on the outside run in whirls; while those on the inside, taking a direction nearly parallel to each other, gave rise to the supposed existence of the *Membrana Ruyschiana*.

It is also furnished with numerous Nerves, which are united with its Vessels by a fine Cellular Texture.

In the Human Eye, the Choroides is of a dusky brown colour, both externally and internally; but the colour varies considerably in the Eyes of different Animals.

The inner Surface of this Coat, which is *Villous*, was described by RUYSCH as a *distinct Lamina*, and has been termed by many Anatomists *Tunica Ruyschiana*.—HALLER, however, and ZINN, and many others who followed them, have demonstrated this Coat to consist of only one Lamina; though in Sheep, and in some other Animals, it appears to be double.

Upon the inner side of the Choroides, there is a Mucus which is found to correspond somewhat with the general colour of the Hair, though commonly it is of a blackish brown, and termed *Pigmentum Nigrum*. It is supposed to be produced from the Vessels of this Coat, and is blackest and thickest at the fore-part of the Eye, where it adheres so tenaciously as to be removed with difficulty; but behind it is thinner, more fluid, and more easily removed; becoming gradually less evident towards the Optic Nerve, round which it almost disappears.

In advanced age, the *Pigmentum Nigrum* becomes more diluted, and of a lighter colour, so that the Vessels of the Choroid Coat may be seen shining through the Vitreous Humour.

Though HALLER denies that the *Membrana Ruyschiana* can ever be separated, in the Human Eye, from the Choroides,—he retains the name, to denote the black Surface of this Coat.

In Grameniverous Animals, in Fishes, and in those Animals which go in quest of prey in the night, the Paint is of a light and shining colour in the bottom of the Eye, and is called *Tapetum*.

In an entirely white Rabbit, the Paint is a-wanting, and the Eye has a red colour from the Vessels of the Choroid Coat; but the redness disappears when the Animal is dead.

At the fore-part of the Choroid Coat, and opposite to the Ciliary Circle, there is a black radiated Ring, called *Corpus Ciliare*, which is about the sixth part of an inch in breadth towards the Temple, but somewhat narrower towards the Nose.

In the posterior portion of the *Corpus Ciliare*, there are numerous pale radiated *Ciliary Striae*, but so covered with the *Pigmentum Nigrum*, as not to be distinctly seen till the Paint is removed.

Near the connection of the *Corpus Ciliare* with the root of the Iris, these *Striae* become gradually broader and more elevated, and form white *Plicae* or *Folds*, about seventy in number, termed *Processus Ciliares*, the intervals of which are also covered with the *Pigmentum Nigrum*.

The *Processus Ciliares* are commonly formed each of two or more *Striae*. They are not all of an equal size, and many of them are forked at their extremities.

The *Corpus Ciliare*, formed of the Ciliary *Striae* and Ciliary Processes, has no appearance of Muscularity, though the contrary has been supposed by some Authors. A fine Injection shews it to be chiefly formed of a continuation of the Blood-vessels of the Choroid Coat, the branches of which divide into such minute parts, as to give the whole a Villous appearance.

The *Corpus Ciliare* is glued to the Retina, at the fore-part of the Vitreous Humour, and a little behind the edge of the Crystalline Lens; but the Ciliary Processes float in the Aqueous Humour in the Posterior Chamber of the Eye, at the inner side of the root of the Iris, and may be readily turned back behind the edge of the Lens, to which they are contiguous, but do not adhere.

The Choroid Coat, with its dark Paint, serves to suffocate the rays of light which pass through the Retina, thereby allowing a distinct image to be formed upon the bottom of the Eye, and preventing the rays from being reflected so as to form a second image.

In those Animals in which this Coat, or its Paint, is of a bright colour, it acts as a mirror to reflect light, and make the impression stronger.

OPTIC NERVE AND RETINA.

The *Optic Nerve*, in its passage through the Orbit, is covered by a continuation of the Membranes which surround the Brain.

At the Foramen Opticum, the *Dura Mater* is divided into two *Laminae*, one of which assists in forming the Periorbitum of the Orbit; the other, which is again divided into two *Laminae*, furnishes a Sheath to the Nerve, and accompanies it to the Tunica Sclerotica, to which it is so firmly connected by Cellular Substance, as to have induced some Authors to describe the Sclerotica as a continuation of the *Dura Mater*.

The Body of the Nerve is still more closely invested by the *Pia Mater*, which also forms Sheaths round the Nervous Fasciculi, and accompanies the Nerve into the Eye.

At the back part of the Ball of the Eye, and a little removed from the Axis, towards the Nose, the *Fasciculi* of the Optic Nerve pass through a Cribiform part of the Sclerotic and Choroid Coats.

The Nerve is contracted at its entrance through the Sclerotic Coat, but immediately after its ingress, it expands to form the Retina,—so called from its supposed Reticular appearance.

In the Centre of the Optic Nerve, where it enters the Eye, the *Artery of the Retina* is seen dividing into Branches, which are dispersed upon its inner Surface.

The Retina advances between the Choroid Coat and Capsule of the Vitreous Humour, to the fore-part of the Eye, and terminates or disappears upon the anterior part of the edge, or greatest diameter of the Capsule of the Crystalline Lens.

The Retina is contiguous to the Choroid Coat and Capsule of the Vitreous Humour, but does not, by Blood-vessels or otherwise, adhere to either, till it reach the Corpus Ciliare.

Under the Corpus Ciliare, the Retina is so covered externally, with the Pigmentum Nigrum, and adheres internally so closely to the Capsule of the Vitreous Humour, as to be prevented from being seen till the black Paint be washed off, or till all the Coats be removed posteriorly, and the Eye viewed through the medium of the Vitreous Humour.

In the back part of the Retina, directly in the Axis of the Eye, there is a Central Hole, of a dark colour, surrounded with a yellow Border, which becomes paler towards the Circumference. The nature of this spot, in the Human Body, is not yet understood; in the large Quadruped, as the Ox, a Lymphatic Vessel is observed to go through it.

The Retina is composed of a tender and Pulpy-like Substance, is semi-transparent, and of a light-grey colour, resembling that of ground glass.

From the entrance of the Optic Nerve to the edge of the Corpus Ciliare, the Retina is of an equal and uniform Substance, and is so easily torn and separated from the edge of that Body, as to be described by many Authors as terminating there.

Under the Striæ and Processes of the Corpus Ciliare, the Retina is thinner than in the posterior part of the Eye, and is so impressed by these Bodies, as also to have the appearance of Striæ terminating in numerous minute Fibres, like Nerves in other parts of the Body.

The Retina is the seat of Vision, and therefore the primary part of the Eye, to which all the other parts within the Orbit are subservient.

HUMOURS.

AQUEOUS HUMOUR.

The *Aqueous Humour* is lodged in the space between the Cornea and Crystalline Lens.

This space is divided into two Cavities, called *Chambers*; the anterior of which is situated between the Cornea and Iris, and is the larger of the two.

The posterior is placed between the Iris and Crystalline Lens, and is so much smaller than the former, that its existence has been denied by some Authors, though it is a distinct Cavity, demonstrable, not only in the A-

dult, where the Pupil is open, but in the Fœtus before the Pupil is formed.

The Aqueous Humour is as clear as the purest water, but is somewhat heavier, possesses a small degree of viscosity, contains a little Salt, and is about five Grains in weight.

In the Fœtus, and for the first month after birth, it is reddish and turbid.

When evacuated, it is quickly renewed; for within forty-eight hours after it has been discharged by puncture, the Cornea is observed to be again perfectly distended.

It is supposed to be secreted from the neighbouring Arteries, particularly from those on the fore-part of the Iris and Ciliary Processes.

It serves to keep the Cornea distended, and, by its roundish form and pellucidity, it collects and transmits the rays of light to the inner parts of the Eye. It likewise guards the Iris and Lens, and admits of the motions of the former.

CRYSTALLINE LENS.

The *Crystalline Lens*, which has its name from its resemblance to Crystal, and from its Lenticular form,—though a solid body, which may be moulded into various shapes,—has always been classed among the Humours of the Eye.

It is situated behind the Aqueous Humour, opposite to the Pupil, and the whole of its posterior part is received into a Depression on the fore-part of the Vitreous Humour.

Like a common Lens, or magnifying Glass, it has two convex Surfaces, the anterior of which is in general less convex than the posterior; the two being formed of segments of spheres of unequal size.

The anterior Surface, according to the experiments of PETIT, forms the segment of a sphere, the diameter of which is between seven or eight lines, or twelfths of an inch; while the posterior Surface is only equal to the segment of a sphere of about five lines in diameter.

It has been observed by ZINN,—that the figure of the Lens varies at different periods, being in the Fœtus almost of a spherical form, but becoming gradually flatter on the anterior and posterior Surfaces, till about the age of thirty, after which its form does not appear to vary.

As the figure, so also the colour and consistency are found to change at different times of life.—In the Fœtus, not only the Capsule, but the Lens also, is of a reddish colour; but, immediately after birth, they become perfectly transparent.—In a person considerably advanced in years, the Lens is observed to acquire a yellow tinge, which appears first in the centre, and afterwards extends gradually to the circumference; and in extreme old age, this yellow tinge becomes so deep as to resemble Amber.

An Aqueous Fluid is described as being situated between the Crystalline Lamellæ, which is supposed to decrease in quantity, and to become somewhat yellow; the Lens at the same time increasing in solidity as the person advances in life.—This difference, however, of convexity, colour, and consistence, according to the difference of age, is not met with uniformly.

The Lens becomes opaque soon after death, and acquires an additional opacity when put into spirit of wine.

It is composed of concentric Lamellæ, laid over each other like the coats of an Onion. These Lamellæ are connected by a fine Cellular Substance, and are more closely compacted the nearer they are to the centre.

This lamellated structure may be readily observed in the Eye of an Ox, or any other large animal, but is most evident when the Lens has been macerated in Water or Vinegar.

When the maceration is continued for some time, the Lamellæ put on a radiated appearance, the Radii running in a vertical manner, or issuing from the centre to the circumference, dividing the Surface into Isosceles Triangles.

The Lamellæ were discovered by LEUWENHOECK to be of a Fibrous structure. By a late writer, these Fibres have been considered as Muscular; but this opinion of the Muscularity of the Lens seems to have gained very few followers.

The substance of the Lens somewhat resembles half-melted Gum, is very soft and tender on the outside, but becomes gradually firmer and tougher towards the centre, where it forms a Nucleus.

The Lens is surrounded by a very pellucid proper Capsule, called *Tunica Aranea*, or *Crystallina*, which is much thicker and more elastic than the Capsule of the Vitreous Humour, but adheres so slightly, and is so easily lacerated, that after a small puncture is made in it, the Lens starts out, upon applying gentle pressure to the Capsule.

The posterior part of the Capsule is much thinner, softer, and weaker than the anterior; but is quite a *distinct Membrane* from the *Tunica Vitrea*; yet so firmly connected to it by Cellular Substance, that it is difficult to separate them without lacerating both the Vitreous Coat and its Humour.

Some Authors describe an *Aqueous Humour* as seated between the Lens and its Capsule; while others, of no small respectability, deny the existence of this Humour, as well as of that which is said to be situated between the Lamellæ of the Lens.

The *Vessels* of the Lens are not to be seen in the Eye of an Adult; but in that of a Fœtus, PETIT found Vessels passing from the Corpus Ciliare, over the fore-part of the Capsule of the Lens.

WINSLOW afterwards observed, that in the Fœtus, and in new-born Children, a fine Injection succeeded so well as to discover the Vessels of the Membrana Crystallina and Vitrea;—and in a Fœtus of about six months,

the injected liquor seemed to him to have penetrated a part of the Crystalline and Vitreous Humours.

ALBINUS derives these Vessels from a double source.—In the Eye of a Whale, he demonstrated Vessels passing from the Ciliary Processes to the substance of the Lens;—and, at a later period, he injected in the human Eye a small Branch arising from the Central Artery of the Retina, which proceeded in a straight direction through the Vitreous Humour, and divided in the posterior part of the Capsule into numerous Branches, many twigs of which plunged into the substance of the Lens.

This Artery and its Branches have been frequently and successfully injected by succeeding Anatomists.

VITREOUS HUMOUR.

The *Vitreous Humour*, is situated in the back part of the Cavity of the Eye, which it occupies from the insertion of the Optic Nerve to the Surface of the Crystalline Lens.

It is round at the back part and sides, where it is covered by the Retina, but is concave before, where it forms a bed for the Crystalline Lens.

It is by much the largest of the Three Humours, occupying upwards of nine-tenths of the whole Eye, and has a Gelatinous appearance,—or is somewhat like the Glaire of an Egg.

In an Adult, it is always very transparent, and in an Old Person, it does not, like the Lens, degenerate into a yellow, or any other colour.

In the Fœtus, like the Aqueous Humour, it is of a reddish colour.

The Liquor with which the Vitreous Humour is filled, is similar to the Aqueous,—very fluid, transpires readily through the Capsule, though that Coat be entire, and, like the Aqueous Humour, is somewhat thicker, heavier, and more viscid than Water.

When this Humour is evacuated by puncture, in the living Body, it is very seldom, though sometimes renewed.

Upon the Surface of this Humour there is a Coat, termed *Vitrea*, or *Hyaloidea*, from its resemblance to Glass, as transparent as the Humour itself, and so thin and Cobweb-like, as to have also the name of *Aranea*.

The *Tunica Vitrea* is remarkably smooth on its outer Surface; but within, it sends Processes into the body of the Humour.

Some Authors, and among these WINSLOW, have described this Coat as consisting of two Laminæ, but SABATIER, and other late Writers, seem sufficiently satisfied that it is a single Layer; and even this single Layer cannot be raised but with difficulty, though it is demonstrable by making a puncture to allow the Humour to escape, and by afterwards distending the part with air.

The structure of the Humour consists of a set of delicate

cate Cells, which contain the Liquor within them, as may be seen by the assistance of Acids, or by boiling Water, or by Congelation.

The Cells of the Humour communicate freely with each other, as appears from the Liquor oozing out by the smallest puncture made in the general Capsule.

Under the Corpus Ciliare, the Capsule of the Vitreous Humour sends off an external Lamina, which accompanies the Retina, and is inserted with it into the fore-part of the Capsule of the Lens, a little before its anterior edge. It is termed *Membranula Coronæ Ciliaris*, or *Zonula Ciliaris*, from its Striated appearance and Circular form, and assists in fixing the Lens to the Vitreous Humour.

After sending off the Ciliary Zone, the Coat of the Vitreous Humour goes behind the Capsule of the Lens, with which it is intimately connected.

Between the Ciliary Zone and part where the Capsule of the Vitreous Humour adheres to that of the Lens,—which is at the same distance behind the edge of the Lens with the distance of the insertion of the Ciliary Zone before it,—a Passage is formed, named *Canalis Petitianus*, after PETIT, who discovered it.

The Membranes forming this Passage are pervaded by transverse Fibres, in such a manner, that when air is introduced, it goes freely round the edge of the Lens; but the Passage has a Cellular appearance, being contracted and dilated alternately.

The Canal of PETIT is nearly of the same breadth with the Corpus Ciliare, is always empty, and has no communication with the Capsules of the Vitreous or Crystalline Humours.

No Vessels are to be seen in the Vitreous Humour of an Adult; but in the Eye of a Fœtus, an Artery is observed to arise from the Central one of the Retina, which passes through the middle of the Vitreous Humour, sending Twigs to the Cellular Texture of this Humour, while the principal Trunk is continued to the Capsule of the Crystalline Lens, as has been already observed.

The Vitreous Humour serves to give shape to the Eye, to keep the Coats properly expanded, to preserve the due distance of the Lens, and direct the rays of light to the Retina.

MUSCLES OF THE BALL OF THE EYE.

The Ball of the Eye is moved by *Six Muscles*, which are divided, on account of their direction, into *Four straight* and *Two oblique* Muscles, obtaining their respective names from their size, situation, direction, or use.

Of the Straight Muscles, one is situated above the Eye, another below it, and one on each side. Of the Oblique, one is placed at the upper and inner, and the other at the under and outer part of the Eye.

The *Recti* are not straight, as the name implies; for, on account of the situation of the Eye and shape of the Orbit, the internal, or that next the Nose, is the only one which runs in a straight direction.

Neither are they all equally long, the internal being the shortest, the external the longest, and the other two nearly of the same length with each other.

The four straight Muscles, which bear a strong resemblance to one another, arise by a narrow beginning, a little Tendinous and Fleishy, from the edge of the Foramen Opticum, where they embrace the Optic Nerve at its entrance into the Orbit.

In their passage forwards, they form Fleishy Bellies, which send off broad and very thin Tendons, to be inserted into the Sclerotic Coat, under the Tunica Adnata, about a quarter of an inch behind the edge of the Cornea, and at equal distances from each other.

At the place of their insertion they are so intimately connected with the Sclerotica, that they cannot be separated from it, or be brought as far as the Cornea, without evident laceration.

The different Muscles of the Ball of the Eye, where they lie upon the Ball, are covered with a Cellular Sheath, which afterwards degenerates into that Cellular Substance which is interposed between the Sclerotica and Conjunctiva.

LEVATOR OCULI,

Vel Rectus Attollens, vel Superbus.

Origin: From the upper part of the Foramen Opticum below the Levator Palpebræ Superioris.

Insertion: Into the upper and fore part of the Tunica Sclerotica.

Action: To raise the fore-part of the Ball of the Eye.

DEPRESSOR OCULI;

Vel Rectus Deprimens, vel Humilis.

Origin: From the inferior part of the Foramina Opticum.

Insertion: Opposite to the former.

Action: To pull the fore-part of the Eye downwards.

ADDUCTOR OCULI;

Vel Rectus Adducens, vel Bibitorius.

Origin: From the Foramen Opticum, between the Obliquus Superior and Depressor.

Insertion: Opposite to the inner Angle of the Eye.

Action: To turn the fore-part of the Eye towards the Nose.

ABDUCTOR

ABDUCTOR OCULI;

Vel *Rectus Abducens*, vel *Indignabundus*.

Origin: From the Bony Partition between the Foramen Opticum and Lacerum.

Insertion: Into the Ball of the Eye, opposite to the outer Angle.

Action: To turn the fore-part of the eye towards the Temple.

When two of the opposite Recti, or all of them, act together, they draw the Eye into the Orbit.

When two of the adjacent Recti act, they turn the fore-part of the Eye obliquely in a direction towards their Origins.

OBLIQUUS SUPERIOR;

Vel *Obliquus Major*, vel *Trochlearis*.

Origin: Like the Straight Muscles, from the edge of the Foramen Opticum, between the Levator and Adductor Oculi. From thence it runs directly forwards, sends off a long round Tendon, which passes through a Cartilaginous Pulley fixed behind the Internal Angular Process of the Os Frontis. From this it goes a little downwards, and returns backwards and outwards, passing under the Levator Oculi.

Insertion: By a broad thin Tendon, into the Tunica Sclerotica, about half-way between the insertion of the Levator Oculi and entrance of the Optic Nerve.

Action: To roll the Ball of the Eye, by turning the Pupil downwards and outwards.

OBLIQUUS INFERIOR;

Vel *Obliquus Minor*.

Origin: By a narrow beginning, from the anterior edge of the Orbital Process of the Superior Maxillary Bone, near the Lacrymal Groove, from which it passes obliquely outwards, backwards, and upwards, round the Ball of the Eye.

Insertion: By a broad thin Tendon, into the Sclerotic Coat, between the entrance of the Optic Nerve and insertion of the Abductor Oculi, and opposite to the insertion of the Obliquus Superior.

Action: To roll the Ball of the Eye, by turning the Pupil upwards and inwards, and, with the assistance of the Obliquus Superior, to pull the Eye forwards; thereby becoming an Antagonist to the Recti.

The two Oblique Muscles, on account of rolling the Eye, and assisting it in the expression of certain Passions, have been called *Rotatores*, and *Amatores*.

VESSELS OF THE EYE.

The *Frontal*, *Facial*, and *Temporal Arteries*, which

are Branches of the External and Internal Carotids, supply the Palpebræ, and communicate with those which are dispersed within the Orbit.

Some small Branches of the *Internal Maxillary Artery* pass through the Inferior Orbital Fissure, to be dispersed chiefly upon the Periosteum of the Orbit and Fat of the Eye.

The *Ocular Artery*, which is a Branch of the Internal Carotid, passes through the Foramen Opticum, in company with the Optic Nerve, and supplies the Fat, Muscles, and Ball of the Eye, and also the Lacrymal Gland and Tunica Conjunctiva.

The branches which belong to the Ball of the Eye, have the name of *Ciliares*, perforate the Sclerotica in different places, and are afterwards dispersed chiefly upon the Choroid Coat and Iris.

One branch of the Ocular Artery, called *Centralis Retinae*, perforates the Optic Nerve, and is dispersed upon the Retina.

The *Veins* which correspond with the Arteries of the Eye, communicate freely with each other, and pass partly to the External Jugular Vein, by Branches situated about the fore-part of the Orbit, and partly to the Internal Jugular Vein, by the Cavernous Sinus.

NERVES OF THE EYE.

Besides the *Optic Nerve*, already taken notice of, the Eye receives the Third and Fourth Pairs, and Branches from the First of the Fifth Pair, together with the Sixth Pair, and Branches from the Seventh.

The parts about the fore-side of the Orbit are supplied by Branches from the Fifth and Seventh Pairs;—the Ball of the Eye by Nerves called *Ciliary*, which come from the Third and Fifth Pairs;—the Fat, Muscles, Lacrymal Gland, &c. are supplied by the Third, Fourth, Fifth, and Sixth Pairs.

The Eye receives and collects the rays of light, in such a manner as to form upon the Retina the image or picture of the object which the Eye looks at; and the point where these different rays meet is called the *Focus*.

The object is painted upon the Retina in an *inverted* manner, the rays from above falling upon its under, and those from below upon its upper part; and it is supposed to be by habit, or rather by instinct, that we judge of the *real* situation of any object.

That the rays of light may terminate distinctly on the Retina, it is necessary that both the Cornea and Crystalline Lens should have a certain degree of convexity.

If either the one or the other be too prominent, the Focus will be formed before it reach the Retina, as is the case in short-sighted people, who require concave glasses

glasses to enable them to see objects distinctly, at the proper and ordinary distance.

If, on the contrary, the Cornea or Lens be too flat, or the refractive power of the Humours be in any way diminished, the Focus will then be imperfectly formed, till the object is viewed at a greater distance than ordinary, as is the case with persons advanced in life, to whom the assistance of convex glasses become necessary.

How an object, viewed with both Eyes, appears

single, has been, as well as our judging of the real situation of any object, ascribed by the generality of Authors to custom and habit; and by others to instinct, which regulates the uniform motion of the Eyes, and the accurate application of both to one point.

The eye is enabled to judge of, or accommodate itself to objects at different distances, by the action of its Muscles increasing or diminishing the length of its Axis, and by the motions of the Iris allowing a greater or smaller quantity of light to be thrown into the Eye.

TABLE

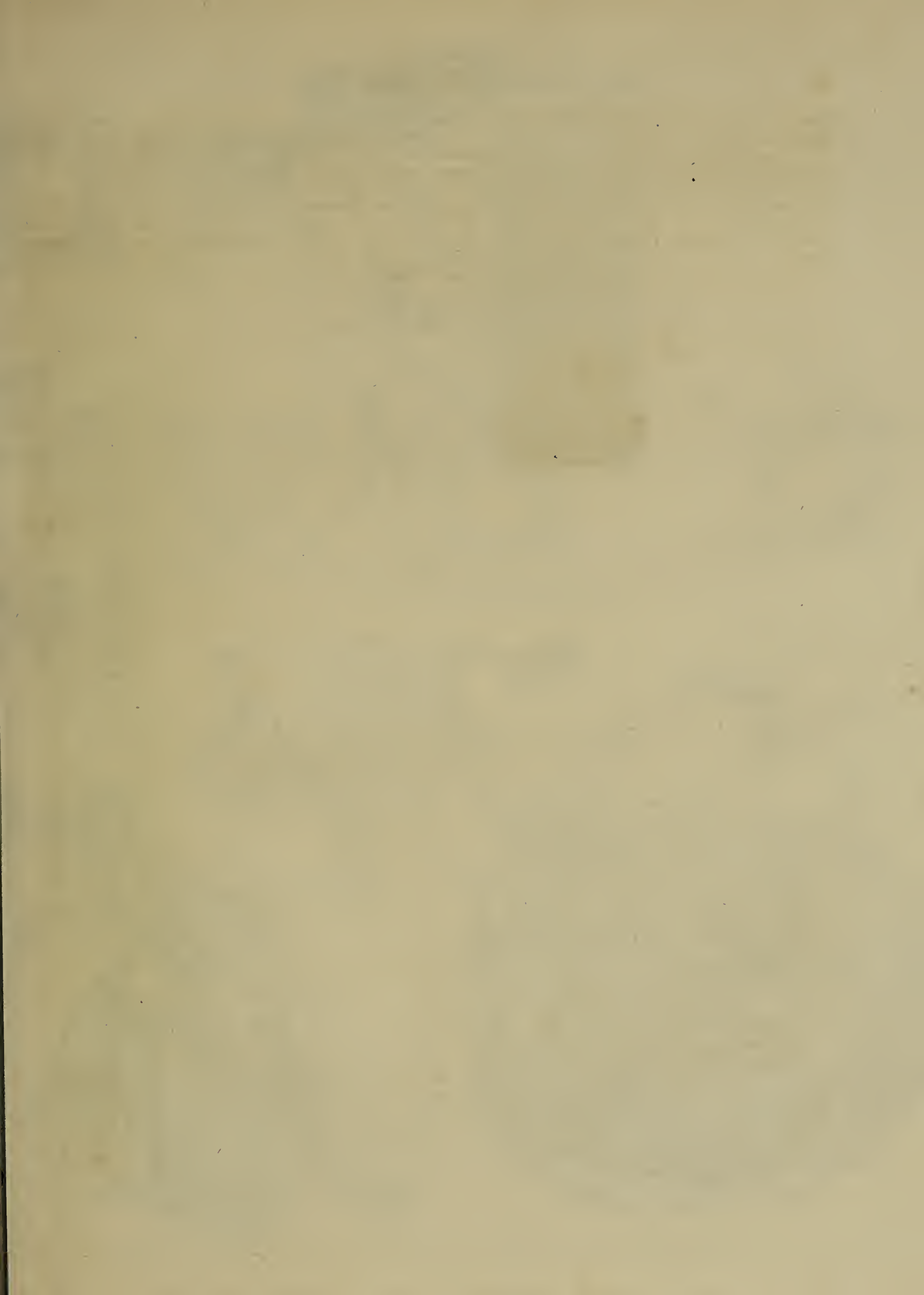
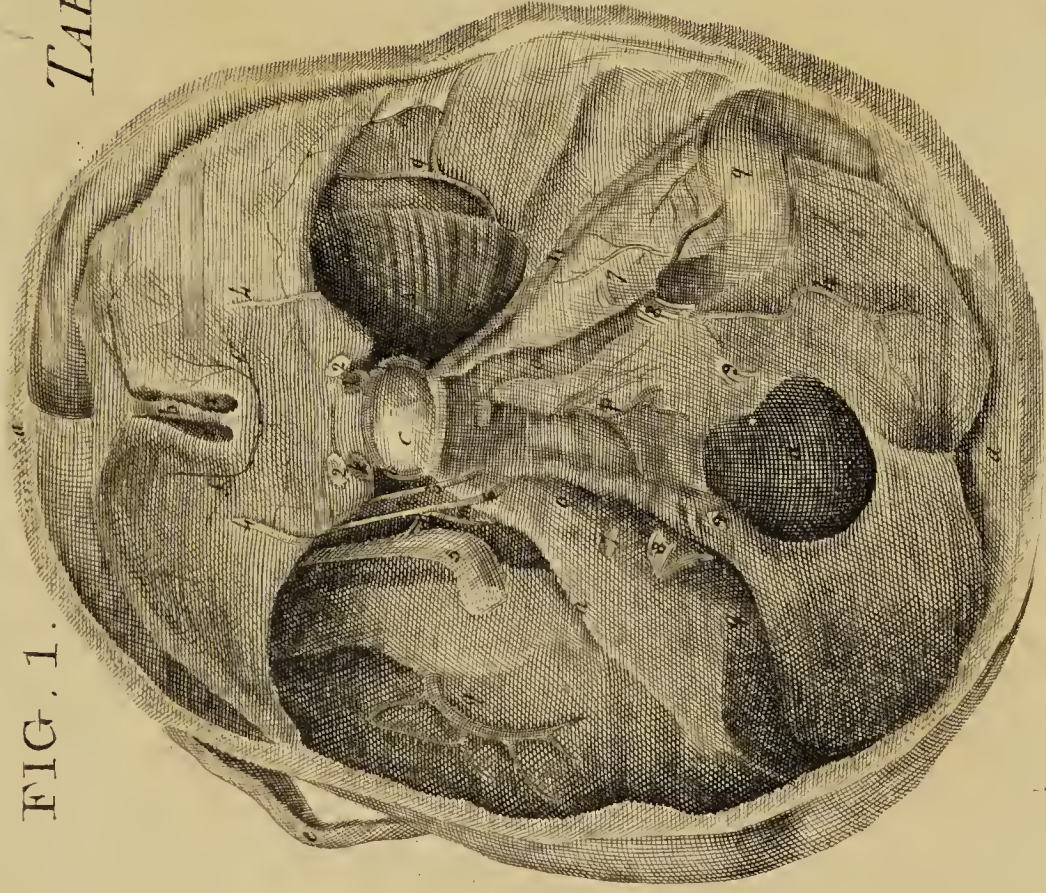


FIG. 1.



TAB. 77.

FIG. 2.



FIG. 3.



FIG. 4.

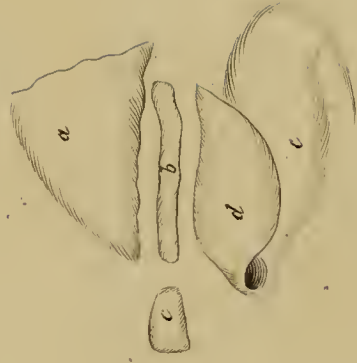


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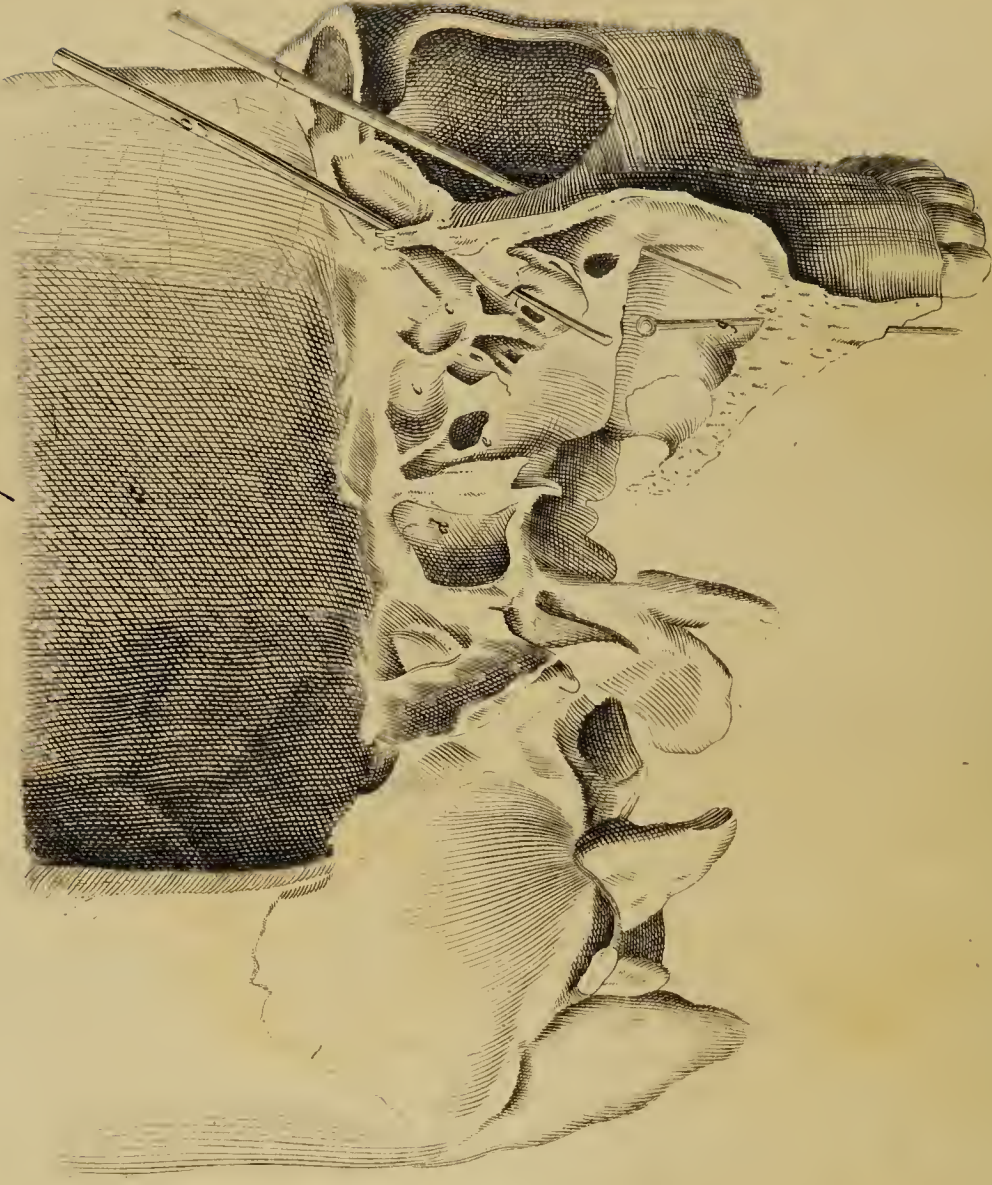


FIG. 6.



FIG. 5.

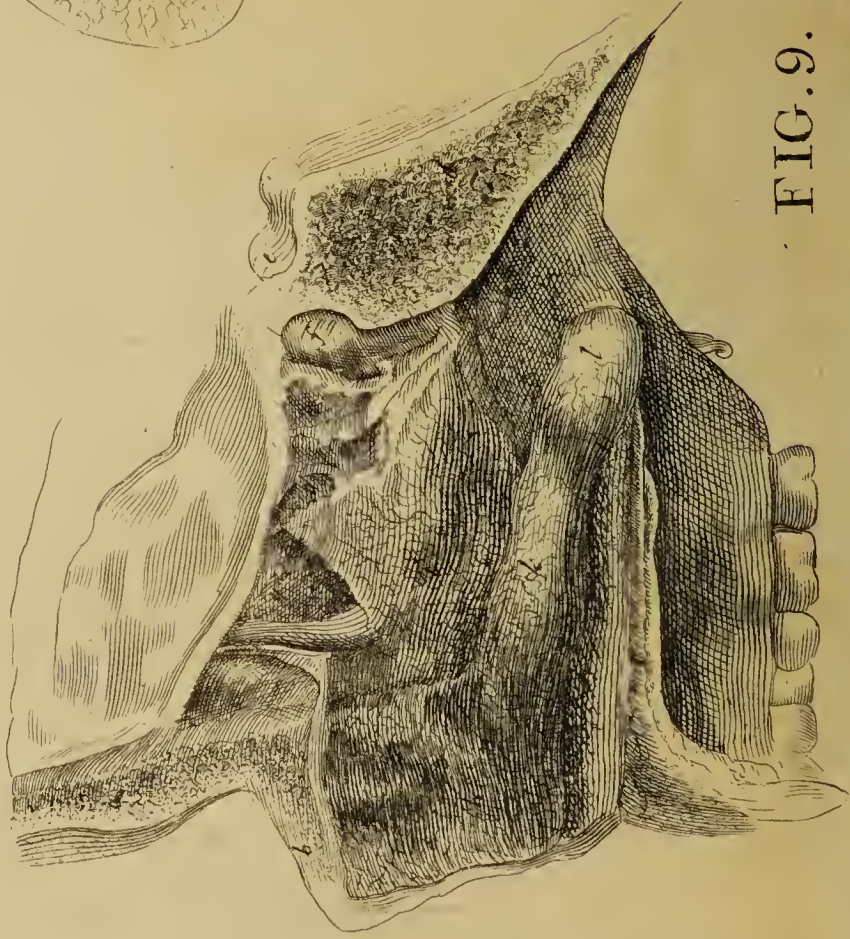


FIG. 9.

FIG. 11.

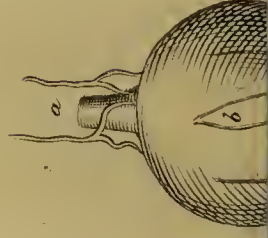


FIG. 10



FIG. 12

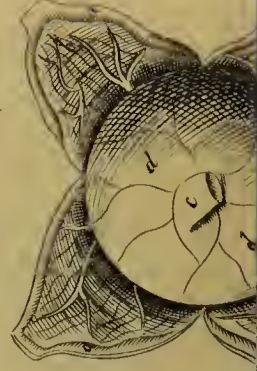




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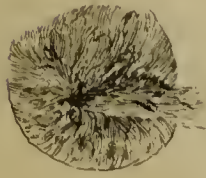


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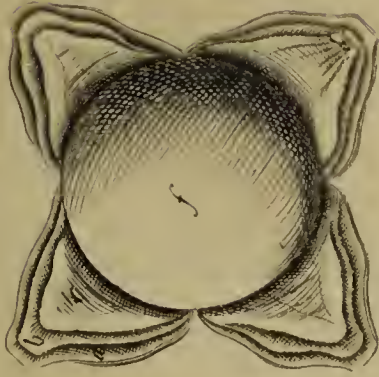


FIG. 15.



FIG. 16.

FIG. 17.

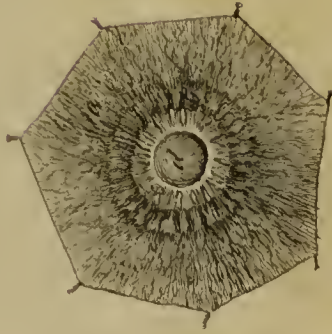


FIG. 18.

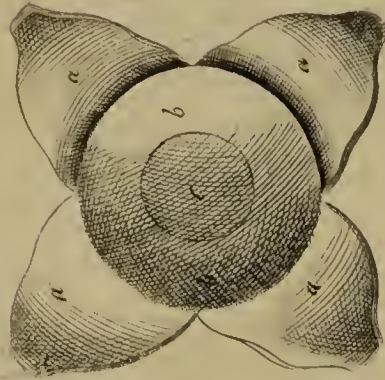


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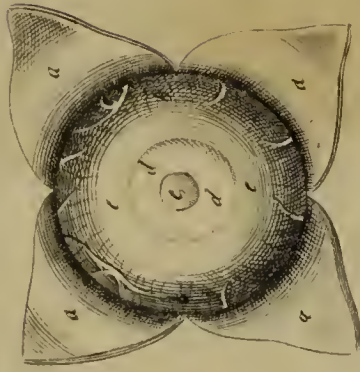


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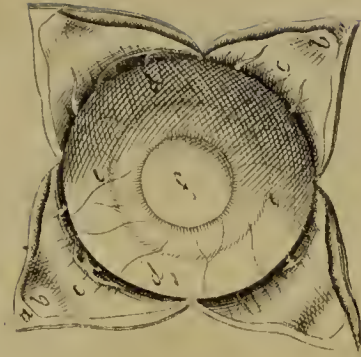


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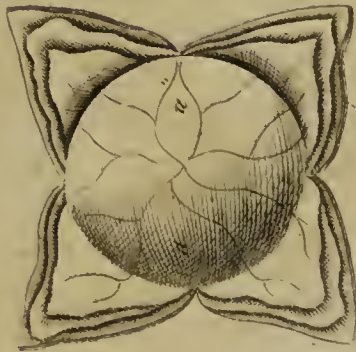


FIG. 22.



FIG. 23.

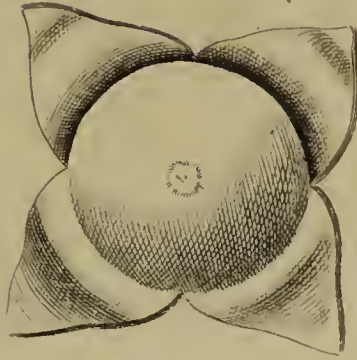
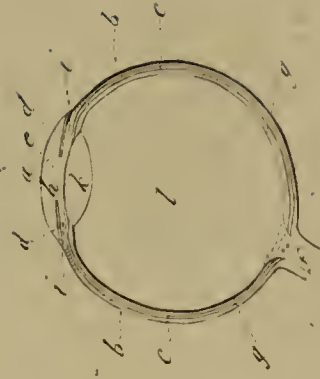


FIG. 24.



T A B L E LXXI.

Represents the Course of the VESSELS and NERVES in the BASE of the CRANIUM; with different Views of the Principal Parts of the Nose, and of the Eye.

FIG. 1.

Represents the Inside of the BASE of the CRANIUM, lined with the DURA MATER;—the Course of the ARTERIES, VEINS, and NERVES;—and the SINUSES which are injected.

- a, a,* The cut edge of the skull.
- b,* The crista Galli.
- c,* The infundibulum inserted into the glandula pituitaria.
- d,* The foramen magnum of the occipital bone.
- e,* The zygoma.
- f, f,* The anterior arteries of the dura mater.
- g, g,* The middle and principal arteries of the dura mater.
- h,* One of the posterior arteries of the dura mater.
- i, i,* The trunks of the internal carotid arteries.
- k, k,* A section of the internal carotid arteries, where they go to the brain.
- l, l,* The circular sinus of Ridley.
- m,* The left cavernous sinus laid open.
- n, n,* The superior petrosal sinuses.
- o, o,* The inferior petrosal sinuses.
- p,* Veins passing into the inferior petrosal sinuses.
- q, q,* The lateral sinuses.
- 1. 1. The passage of the first pair of nerves.
- 2. 2. A section of the optic nerves.
- 3. The left part of the third pair of nerves.
- 4. 4. The fourth pair, turned forwards.
- 5. 5. The fifth pair, in its natural situation on one side, and turned outwards on the other.
- 6. 6. The sixth pair.
- 7. The upper end of the great sympathetic nerve, connected in this figure with the fifth and sixth pairs.
- 7. 7. The seventh,
- 8. 8. The eighth, and,
- 9. 9. The ninth pair.

FIG. 2.

A View of the Left Side of the Nose, with the Musculus Levator Labii Superioris Alæque Nasi, one part of which is turned down.

FIG. 3.

Shews the Cartilages of the Nose, viewed on the Left Side. —Part of the Muscles connected with the Cartilages of the Nose are pinned out.

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FIG. 4.

A View from the Left Side of the CARTILAGES which form the Under Part of the Nose.

- a,* The first or upper cartilage.
- b,* The second,
- c,* The third,
- d,* The fourth cartilage.
- e,* The membranous part of one of the alæ nasi.

FIG. 5.

The Right Portion of the UPPER JAW, and Fore-Part of the BASE of the CRANIUM, divided from the SEPTUM NARIUM, and viewed from the Left Side.

- a,* The os frontis.
- b,* ——— nasi.
- c,* The ossæous plate.
- d,* The cuneiform process of the occipital bone, united with the back part of the os sphenoides.
- e,* The sella Turcica.
- f,* The sphenoid sinus.
- g, g, g,* The ethmoid cells, which, with the other parts of the nostril, are lined with the mucous membrane.
- h,* The fore-part of the nostril.
- i,* The os spongiosum superius.
- k,* ——— inferius.
- l,* A glandular body resembling the uvula.

FIG. 6.

The Left Side of the SEPTUM NARIUM, with its Mucous Covering, and small Arteries, which are much more numerous than could here be represented.

- A,* Part of the os frontis.
- B,* The septum, with its numberless arteries.

FIG. 7.

A Section of the CRANIUM and UPPER JAW, to shew some of the Passages which terminate in the NOSE.

- a,* The cavity of the cranium.
- b,* A probe introduced from the cavity of the left frontal sinus, into the corresponding nostril.
- c, c, c,* The ethmoid cells.

F

d, The

TABLE LXXI. CONTINUED.

- d*, The sphenoid sinus of the right side.
e, A passage by which this sinus opens into the right nostril.
f, A probe passed from the left lacrymal groove into the cavity of the left nostril.
g, A probe passed through the foramen incisivum into the mouth.

FIG. 8.

Represents the BALL of the Right EYE, seen on the Upper Part.

- a*, The cornea.
b, The tunica adnata, with its vessels.
c, The tunica adnata, cut from the eye-lids, which are lined on the inner side by this coat reflected from the ball.
d, The tunica sclerotica.
e, The optic nerve.

FIG. 9.

Posterior View of the GLOBE of the EYE.

- a, a, a, a*, The tunica sclerotica dissected round the optic nerve, and then cut into four parts, as far as the middle of the ball, and the angles turned aside.
b, The optic nerve, cut off.
c, c, The choroid coat and its vessels. These, and the vessels of several other Figures of this Table, are rudely expressed.

FIG. 10.

Shews the TUNICA CHOROIDES, the TUNICA ADNATA and SCLEROTICA being removed;—from a BOY of six or seven years of age.

- a*, The ocular arteries, various branches of which go to the bottom of the tunica choroides, and various others to the middle of it.
b, The ciliary ligament.
c, The iris.
d, The pupil.

FIG. 11.

The CHOROID COAT, the SCLEROTIC being removed, and the ARTERIES left-out, to shew the CILIARY NERVES.

- a*, The ciliary nerves.
b, Their continuation upon the choroid coat.
c, The iris, upon which the ciliary nerves terminate.

FIG. 12.

The same BALL with that represented in Fig. 9. also viewed Posteriorly. The SCLEROTIC and CHOROID COATS are cut, and turned back.

- a, a, a, a*, The sclerotic coat, turned back.

- b, b, b, b*, The choroid coat, also cut and turned back.
c, A section of the optic nerve near the ball.
d, d, The retina, with its blood-vessels.

FIG. 13.

Shews the Inner Surface of the CHOROID COAT, or TUNICA RUYSCHIANA so called, from the Centre of which a Portion of the RETINA depends.

- a*, A large portion of the choroid coat.
b, The depending portion of the retina, going from the bottom of the eye.
c, Numberless small arteries dispersed over the inner surface of the choroid coat, emerging from the bottom of the eye, and running in a direction different from those of its outer surface.

FIG. 14.

Another Posterior View of the same BALL, (Fig. 9.), the TUNICA SCLEROTICA, together with the CHOROIDES, and the RETINA, being dissected, and turned back in the same manner.

- a, b, c*, The reclined angles of the tunica sclerotica, choroides, and retina;—the other angles are turned back in the same manner.
d, The extremity of the optic nerve adhering to one of the angles of the retina.
f, The vitreous humour.

FIG. 15.

The same part of the same BALL, the same COATS dissected, and turned back, but the VITREOUS HUMOUR removed.

- a, b, c, d*, As in the preceding figure.
e, e, The anterior part of the retina entire, extending to,
f, The crystalline lens.

FIG. 16.

The same BALL, dissected and opened as above; but besides the VITREOUS HUMOUR, the CRYSTALLINE LENS and RETINA are also removed.

- a, b*, As above.
c, c, The anterior part of the choroid coat.
d, d, The ciliary processes.
e, e, The iris.
f, The pupil.

FIG. 17.

The Inner Surface of the CHOROID COAT expanded, with the LIGAMENTUM CILIARE, and its Processes.

- a*, The inner surface of the choroid coat, covered with small arteries.
b, The

- b, The ciliary processes.
c, The posterior surface of the iris.
d, The pupil.

FIG. 18.

The same BALL with Fig. 16. dissected in the same part and manner, and laid open; but consisting only of the SCLEROTICA and CORNEA; the HUMOURS being entirely removed.

- a, a, a, a, The sclerotic coat dissected, and its angles turned back.
b, b, The anterior part of the sclerotica entire.
c, The cornea.

FIG. 19.

The same BALL, viewed Anteriorly. The CORNEA, with the SCLEROTICA, are dissected into four parts, from the middle of the CORNEA to the middle of the BALL, and the Angles are turned back.

- a, a, a, a, The reflected angles of the cornea and sclerotica.
b, b, The tunica choroides, and its blood-vessels.
c, c, The ciliary circle.
d, d, The iris.
e, The pupil.

FIG. 20.

The same BALL opened on the Anterior Part, in a similar manner, but the SCLEROTICA and CHOROIDES also dissected, and turned back.

- a, a, b, c, The reflected angles of the sclerotica and choroides.
d, d, The retina, with its vessels.
e, e, Vestiges of the ciliary processes.
f, The crystalline lens.

FIG. 21.

The same as the former, but along with the SCLEROTICA and CHOROIDES, the RETINA also is dissected, and turned back, and the CRYSTALLINE LENS and VITREOUS HUMOUR removed, to shew,

- a, a, The posterior part of the retina, with its vessels.

FIG. 22.

The same as the former, but the RETINA also removed, to shew,

- a, a, The choroides, with its blood-vessels, rudely expressed.
b, The entry of the optic nerve.

FIG. 23.

The same BALL. It consists of the Sclerotica and Cornea only, the other parts being removed.

FIG. 24.

An Horizontal SECTION of the EYE-BALL, shewing the situation of its COATS and HUMOURS.

- a, The cornea.
b, b, The sclerotic coat.
c, c, The choroid coat connected at its fore-part to the root of the iris and tunica sclerótica, and then turning inwards to form the ciliary processes.
d, d, The iris.
e, The pupil.
f, The optic nerve.
g, g, The retina.
h, The anterior, and,
i, i, The posterior chambers in which the aqueous humour is lodged.
k, The crystalline lens.
l, The vitreous humour.

T A B L E LXXII.

Different Views of the EYE, of the EYE-LIDS, and of the LACRYMAL GLAND
and DUCTS.

FIG. 1.

The MEMBRANULA CORONÆ CILIARIS,—with the CANAL of PETIT inflated.

- a*, The vitreous humour.
- b*, The crystalline lens.
- c*, A serrated ring, composed of a black pigment spread upon the anterior part of the vitreous humour and corona ciliaris.
- d*, Small bubbles into which the membranula coronæ ciliaris is raised by inflation.
- e*, A small puncture through which the air was introduced.

FIG. 2.

A Horizontal SECTION of the COATS of the EYE, magnified.

- a*, The optic nerve dissected.
- b*, The exterior, and,
- c*, The interior lamina of the sheath of the optic nerve.
- d*, The pia mater of the optic nerve.
- e*, The central artery of the retina.
- f*, Part of the lamina cribrosa, through which the medullary substance of the optic nerve passes.
- g*, The tunica sclerotica, thicker posteriorly, where it is connected with the sheath of the optic nerve.
- h*, The circle surrounding the lamina cribrosa, from whence the pia mater of the optic nerve is turned back.
- i, i*, The inner part of the tunica sclerotica.
- k, l*, Arteries which run longitudinally in the inner surface of the choroides.
- m*, The white plicæ of the ciliary processes.
- n*, The iris.
- o*, The connection of the sclerotica with the cornea.

FIG. 3.

The OBLIQUUS INFERIOR MUSCLE of the EYE.

- a*, The ball of the eye.
- b*, The abductor muscle.
- c*, The depressor.

- d*, The obliquus inferior, arising from the anterior edge of the orbit.
- e*, The insertion of this muscle into the ball of the eye.

FIG. 4.

Three Figures of the CRYSTALLINE LENS, from Subjects of different Ages.

- a*, From a new-born child.
- b*, From a child a few years old.
- c*, From an adult of twenty years of age.

FIG. 5.

The MUSCLES of the EYE, with the LEVATOR PALPEBRÆ SUPERIORIS.

- a*, The ball of the eye.
- b*, The optic nerve in the muscular cavity.
- c*, A section of the optic nerve before its entrance into the orbit.
- d*, A portion of the dura mater which leaves the optic nerve, to go into the periosteum of the orbit.
- e*, The levator palpebræ superioris, arising from the angle of separation of the dura mater, and terminating in a broad aponeurosis.
- f*, The attollens muscle, a great part of it covered by the levator palpebræ.
- g*, The obliquus superior, bending through the trochlea.
- h*, The insertion of the obliquus inferior.
- i*, The depressens muscle.
- k*, The abducens muscle, arising with a double head.
- l*, The upper small head.
- m*, The under head.
- n*, The interval between the two heads, through which a fasciculus of nerves is transmitted.
- o*, The first branch of the fifth pair of nerves.
- p*, The lacrymal branch of this first branch.
- q*, The frontal branch cut off.
- r*, The nasal branch.
- s*, The root of the nasal branch, which forms the long root of the ophthalmic ganglion.

t, The

TAB. 72.

Fig. 1.

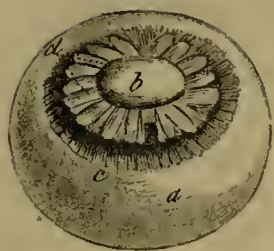


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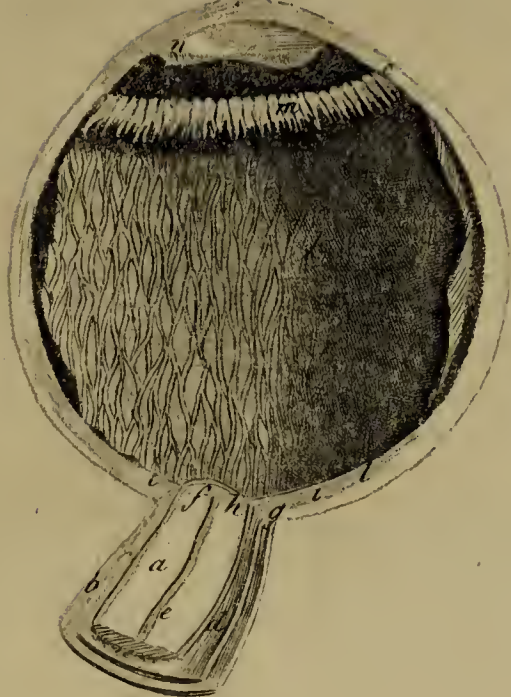


Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

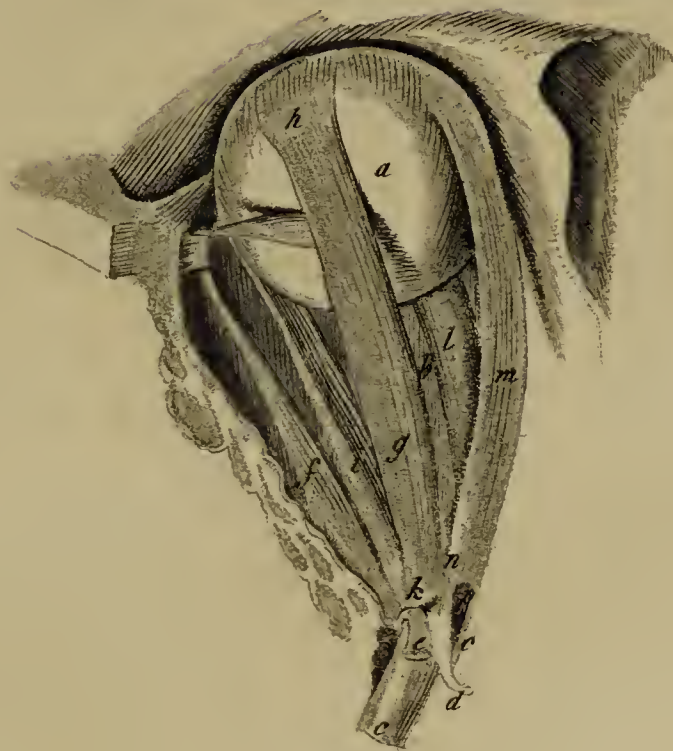


Fig. 7.



Fig. 9.

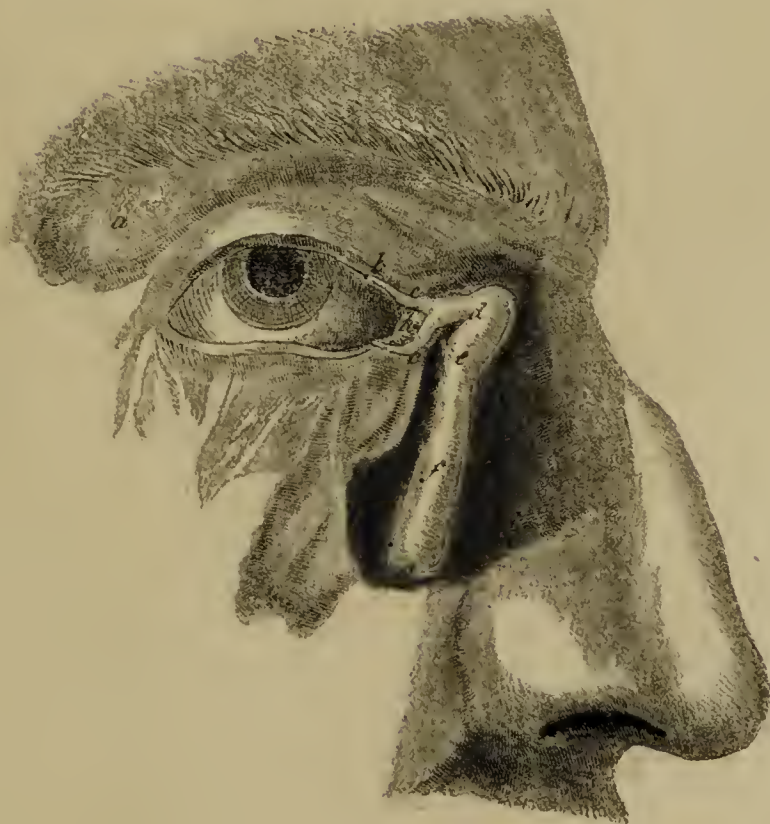


Fig. 8.



- t*, The third pair of nerves.
u, The sixth pair of nerves.

FIG. 6.

The MUSCLES of the EYE;—the LEVATOR PALPEBRÆ removed.

- a*, The ball of the eye.
b, The optic nerve within the orbit.
c, ————— without the orbit.
d, A portion of the dura mater which goes into the periorbitum.
e, The levator palpebræ cut off near its origin.
f, The obliquus superior, bending through the trochlea.
g, The attollens muscle;
h, Its tendon expanded near its insertion.
i, The adducens muscle.
k, The two last-mentioned muscles, connected with each other near their origin.
l, The deprimens muscle.
m, The abducens muscle.
n, The upper head connected with the attollens.
o, The inferior head.
p, The interval between the two heads.

FIG. 7.

Represents the Upper EYE-LID of the Right Side, with the LACRYMAL GLAND.

- a*, The inner side of the upper eye-lid.
b, b, The two puncta lacrymalia, into which the two ends of a bit of wire are introduced.
c, Part of the under eye-lid.
d, The external canthus.
e, The lacrymal gland.
f, A number of smaller lacrymal glands, lying between *e* and the conjunctiva, called by DR MONRO *Glandulæ Lacrymales Congregatæ*.

- g*, Four bristles introduced into the ducts of the lacrymal gland.
h, One of these ducts into which quicksilver was injected, which is hid where it passes between the glandulæ congregatæ *f*, but appears again where it comes out of the glandula lacrymalis, composed of three branches.
i, A part of the tunica conjunctiva, at which, before the preparation was immersed in spirits, the orifices of two or three very small lacrymal ducts could be perceived.

FIG. 8.

Represents the EYE-LIDS of the LEFT EYE, viewed from the Posterior Interior Part;—the GLANDULÆ MEIBOMIANÆ; the CARUNCULA and PUNCTA LACRYMALIA, with the PASSAGES by which these communicate with the NOSTRILS.

- a, b*, The inner coat of the eye-lids.
c, c, The cilia.
d, e, The upper and under tarsus, with their sebaceous follicles, each terminating in a peculiar small foramen at the margin of the eye-lid.
f, The puncta lacrymalia.
g, The caruncula lacrymalis, and the lacrymal sac into which the ducts of the puncta lacrymalia open.
h, The lacrymal duct.
i, The extremity of the lacrymal duct, with a small portion of the membrane of the nose left around it.

FIG. 9.

A View of the LACRYMAL PASSAGES, the INTEGUMENTS and BONES being removed.

- a*, The lacrymal gland.
b, c, The puncta lacrymalia, with the lacrymal canals proceeding from them to,
d, The lacrymal sac.
e, A contraction of the sac, forming,
f, The lacrymal duct;
g, Its termination in the nose.
h, The caruncula lacrymalis.

T A B L E LXXIII.

VIEWS of the COATS, MUSCLES, VESSELS, and NERVES of the EYE.

FIG. 1.

The External VESSELS of the EYE, to obtain a View of which, a great part of the ORBICULARIS MUSCLE is removed.

- a, Part of the orbicularis palpebrarum.
- b, The ciliary ligament.
- c, The extremity of the os nasi.
- d, A branch of the temporal artery.
- e, Branches of the supra-orbital artery to the fore-head, communicating with the branches of the temporal artery.
- f, The trunk of the ocular artery.
- g, Branches to the nose.
- h, The infra-orbital artery.
- i, The labial artery.

FIG. 2.

A View of the Upper Side of the EYE-BALL and its VESSELS; the ARCH of the ORBIT, the LEVATOR PALPEBRÆ, and RECTUS SUPERIOR MUSCLES, being removed.

- A, The optic nerve, with its curvatures.
- B, The trochlearis muscle passing through its pulley.
- C, The lacrymal gland.
- D, The tarsus of the upper eye-lid.
- E, The thick part of the os malæ.
- F, Part of the os frontis.
- G, The levator palpebræ and levator oculi, turned aside.
- H, The adductor oculi.
- I, The depressor oculi.
- K, The abductor oculi.
- a, The internal carotid artery.
- b, The ocular artery.
- c, The lacrymal artery.
- d, The external ciliary artery.
- e, Branches to the Muscles, between the eye and outside of the orbit.
- f, The superior ciliary arteries.
- g, The origin of the inferior ocular artery.
- h, The supra-orbital artery.
- i, The anterior ethmoid artery.
- k, The common palpebral trunk.

l, The superior palpebral arch.

m, The nasal branch.

n, A branch from the temporal artery to the superior tarsal arch.

FIG. 3.

The EYE divested of its superior MUSCLES, and turned outwards, so as to bring its Inferior VESSELS into view.

- A, The optic nerve.
- B, The sclerotic coat.
- C, The cornea, with the iris and pupil appearing through it.
- D, The depressor oculi.
- E, The inferior oblique muscle.
- F, A section of the frontal bone.
- G, The anterior ethmoid cell.
- H, Part of the frontal bone.
- a, The ocular artery drawn with the eye out of its place.
- b, The inferior branch of the eye.
- c, c, The ciliary arteries.
- d, The infra-orbital artery. The other branches are seen supplying the lower parts of the orbit in general, and some passing into the ethmoid cells.

FIG. 4.

Represents the CHOROID COAT and CILIARY ARTERIES, the SCLEROTICA being partly removed.

- A, A, B, The cut edges of the sclerotic coat.
- C, The cornea, with the iris and pupil.
- D, D, The choroid coat.
- a, The optic nerve.
- b, The ocular artery.
- c, c, The ciliary arteries.
- d, The central artery of the retina.
- e, Another branch to the dura mater of the optic nerve.
- f, The ciliary arteries forming a ring at the entrance of the optic nerve.
- g, The long ciliary arteries.
- h, h, The posterior ciliary arteries, perforating the sclerotic, and running upon the surface of the choroides, where they form numerous anastomoses.

FIG.

Fig. 3.

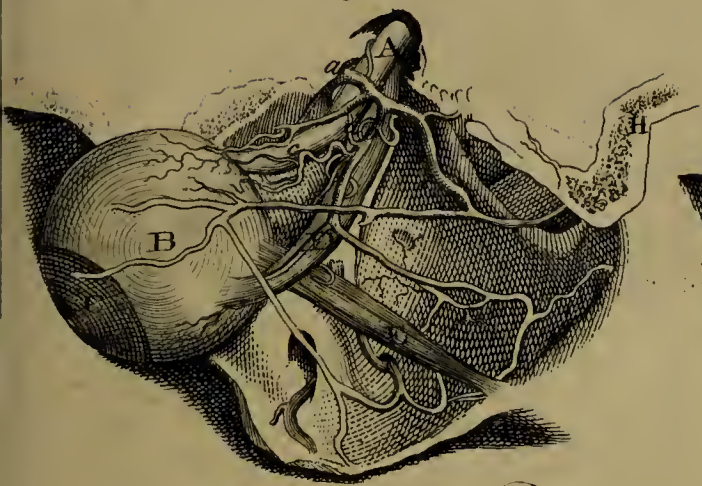


Fig. 2.



Fig. 1.



Fig. 8.

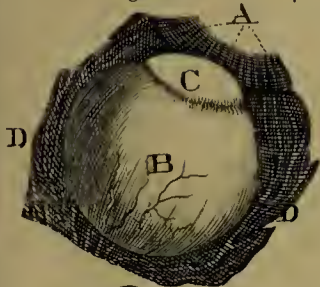


Fig. 7.



Fig. 6.

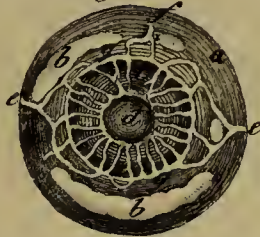


Fig. 5.



Fig. 4.

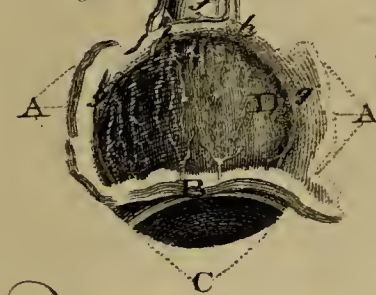


Fig. 9.

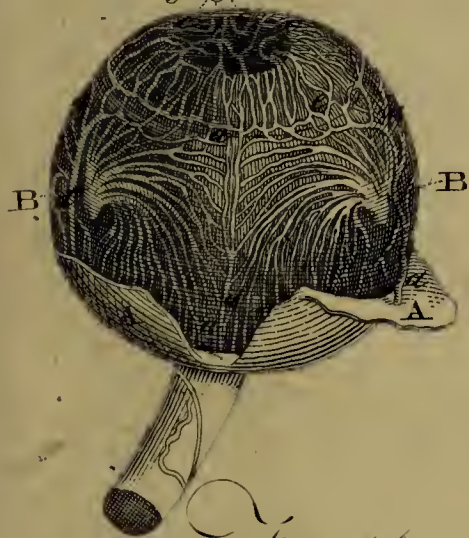


Fig. 10.

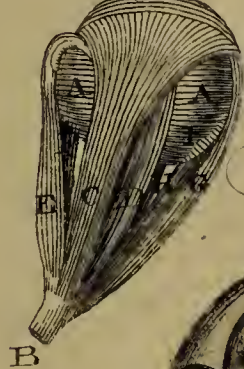


Fig. 11.

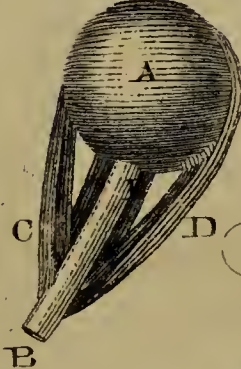


Fig. 12.



Fig. 1A.



Fig. 13.

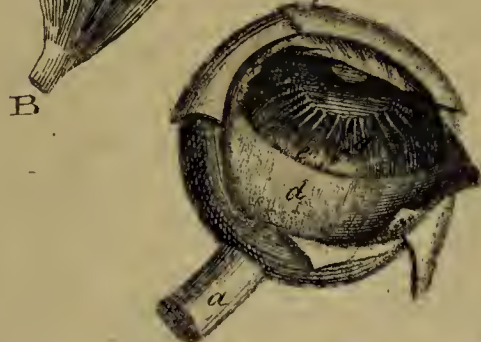


Fig. 16.

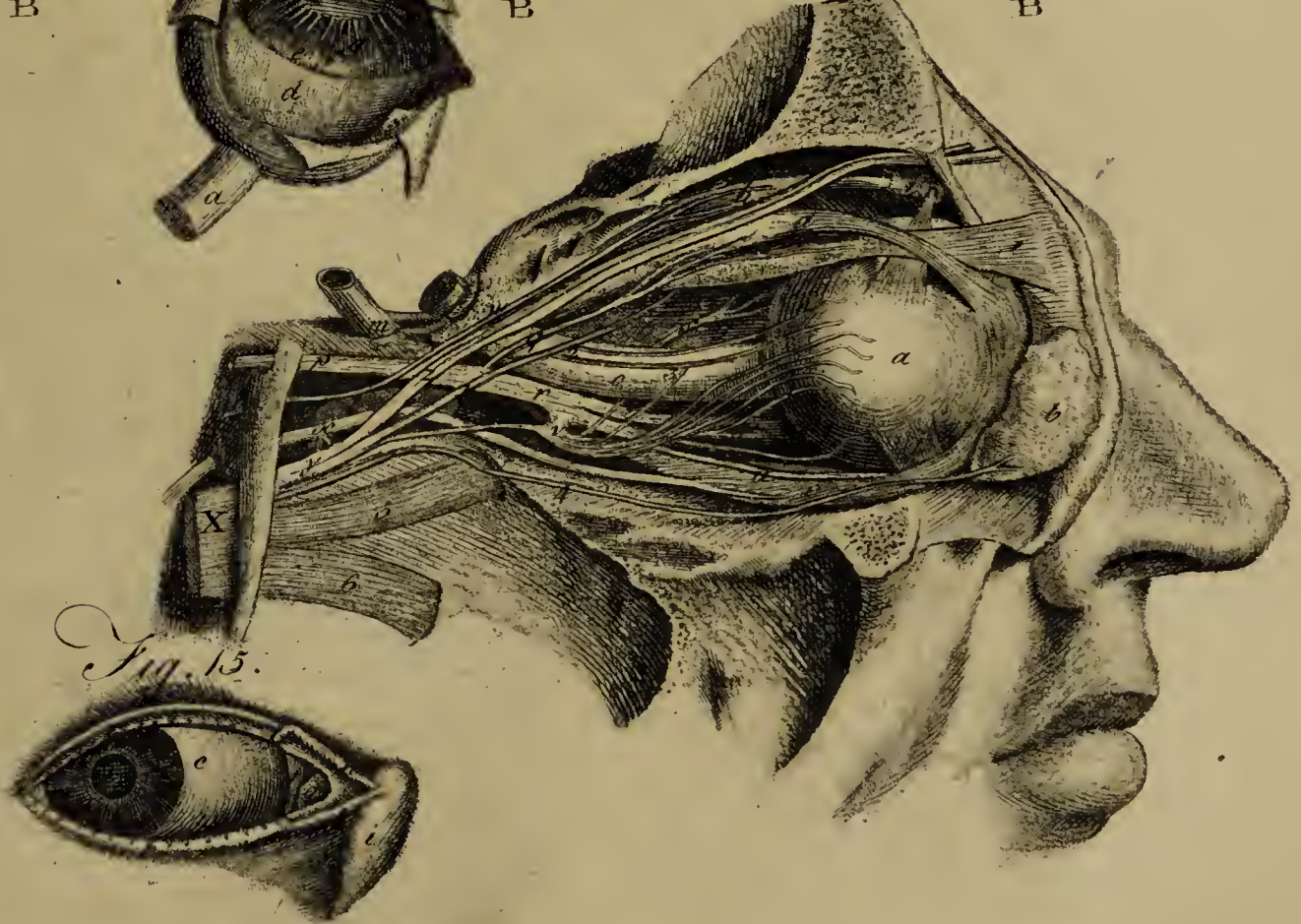


FIG. 5.

Shews the CHOROID COAT, the CILIARY CIRCLE, and IRIS, with their VESSELS; the SCLEROTIC COAT and CORNEA being removed.

- A, A, A, The ciliary circle.
- B, B, The iris.
- C, C, The vorticoſe veins.
- a, a, The long ciliary arteries.
- b, The large ring of the iris, formed by the ciliary arteries.

FIG. 6.

The Fore-part of the EYE, from which the CORNEA is removed, to shew the CILIARY CIRCLE, IRIS, and PUPIL, with the disposition of their VESSELS.

- a, a, The choroid coat.
- b, b, The ciliary circle.
- c, c, The iris.
- d, The cryſtalline lens appearing through the pupil.
- e, e, The long ciliary arteries.
- f, The anterior ciliary artery inſerted into the circular artery.
- g, g, The large circular artery of the iris, formed by the different ciliary arteries.

From the large circular artery branches run in radii to the ſmall circle of the iris.

FIG. 7.

A Side-View of the EYE-BALL, from which the SCLEROTIC and CHOROID COATS are partly removed, to shew the RETINA, and the course of the CENTRAL ARTERY on it.

- a, The optic nerve.
- b, b, The choroid coat, turned back.
- c, The ſclerotic coat and cornea, alſo turned back.
- d, The retina.
- e, The ciliary proceſſes.
- f, The ſtriæ of the retina formed by the impreſſions of the ciliary proceſſes.
- g, The ophthalmic artery.
- h, The central artery of the retina penetrating the optic nerve.
- i, The continuation of that artery appearing through the retina.

FIG. 8.

The EYE-BALL nearly as in the former Figure, but the CORNEA and SCLEROTICA removed, and the CRYSTALLINE LENS brought more into view.

- A, The ciliary proceſſes.
- B, The retina, with the branches of the central artery of the retina, inveſting the vitreous humour and its capſule.

- C, The cryſtalline lens covered by its capſule.
- D, D, The choroid coat, with its veſſels.

FIG. 9.

Represents the EYE-BALL of a FœTUS magnified, from which the CORNEA and part of the SCLEROTICA have been removed, to shew the CHOROIDES, IRIS, and PUPIL, with the distribution of the BLOOD-VESSELS.

- A, A, Part of the tunica ſclerotica.
- a, a, a, a, The tunica choroides.
- a, b, The iris.
- C, b, c, c, c, The membrana pupillaris, or membrane which, in the fœtus, fills the pupil.
- d, d, d, The long ciliary veſſels.
- e, e, Circular and radiated veſſels upon the iris.
- b, Veſſels running irregularly upon the membrana pupillaris.
- B, B, The large vorticoſe veſſels on the ſurface of the choroid coat, anastoſing with each other and with thoſe of the iris.

FIG. 10.

A View of the BALL and MUSCLES of the EYE.

- A, A, The eye-ball.
- B, The optic nerve, with the origin of the muſcles.
- C, The levator palpebræ ſuperioris, with part of the eyelid to which it is fixed.
- D, The levator oculi.
- E, The trochlearis, or ſuperior oblique muſcle.
- F, The adductor oculi.
- G, The abductor oculi.
- H, The depreſſor oculi.
- I, Inſertion of the obliquus inferior.

FIG. 12.

The EYE, deprived of ſome of its MUSCLES.

- A, The eye-ball.
- B, The optic nerve.
- C, The adductor oculi.
- D, The abductor oculi.
- E, The depreſſor oculi.

FIG. 12.

The LEFT EYE-BALL, with all its MUSCLES ſeen from the Upper and Outer Part.

- A, The eye-ball.
- B, The optic nerve.
- C, The trochlearis, or ſuperior oblique muſcle.
- D, The obliquus inferior turned from before backwards.
- E, The levator,
- F, The abductor,
- G, The depreſſor, and,
- H, The adductor oculi.

FIG.

FIG. 13.

The Three COATS of the EYE removed on one side, to obtain a View of the HUMOURS in situ.

- a*, The optic nerve.
- b*, The tunica sclerotica.
- c*, The choroid turned back upon the sclerotic coat.
- d*, The retina lying upon the vitreous humour.
- e*, The anterior termination of the retina, according to the author of this figure.
- f*, The posterior serrated part of the ciliary processes.
- g*, The plicæ of the ciliary processes, with white radii.
- h*, The place where the white radii appear going from the lens.

FIG. 14.

Shews the STRUCTURE of the IRIS and CILIARY NERVES. The EYE somewhat magnified.

- a*, The optic nerve.
- b, b, b, b*, The sclerotic coat turned back.
- c, c*, Some of the large ciliary nerves divided anteriorly into branches.
- d*, Some smaller ciliary nerves, with scarcely any branches.
- e, e*, Two of the large ciliary veins, commonly called Vasa Vorticosa.
- f*, A hole in the sclerotic coat, through which the vorticoſe vein paſſes.
- g*, A ſmall ciliary vein.
- h*, The ciliary circle.
- i*, The large ring of the iris.
- k*, The parallel ſerpentine fibres of the iris.
- l*, The ſmall circle of the iris, formed by arches which join the large fibres with each other.—Straight fibres are ſeen going from the convexity of the arches to the pupil.
- m*, The pupil.

FIG. 15.

A View of the LACRYMAL PASSAGES.

- a*, The upper eye-lid.
- b*, Orifices of the glandulæ Meibomianæ.
- c*, The ball of the eye.
- d*, The iris appearing through the cornea.
- e*, The pupil.
- f*, The ſmall ſemilunar membrane before the caruncula lacrymalis.
- g*, The caruncula lacrymalis.
- h, h*, The ducts of the puncta lacrymalis, which terminate together in,
- i*, The lacrymal ſac.

FIG. 16.

The NERVES of the BALL and of the MUSCLES of the EYE.

- a*, The ball of the eye.
- b*, The lacrymal gland.
- c*, The abducens muſcle.
- d*, The attollens muſcle.
- e*, The levator palpebræ.
- f*, The deprimens muſcle.
- g*, The adducens muſcle.
- h*, The obliquus ſuperior.
- i*, The trochlea.
- k*, Part of the obliquus inferior muſcle.
- l*, The courſe of the carotid in the receptaculum.
- m*, The carotid, where it penetrates into the cavity of the cranium, with the ocular artery ariſing from it.
- n*, The optic nerve paſſing through its foramen.
- o*, The optic nerve within the orbit.
- p*, The trunk of the nerve of the third pair.
- q*, The ſuperior ſmall branch of the third pair.
- r*, The ſhort root of the ophthalmic ganglion, from the nerve of the obliquus inferior.
- s*, A branch of the third pair of nerves to the adducens muſcle.
- t*, A branch of the third pair of nerves to the deprimens muſcle.
- u*, A branch of the third pair to the obliquus inferior.
- v*, The ophthalmic ganglion, freed from its connection with the optic nerve, and turned outwards, to obtain a view of the diviſion of the third pair of nerves.
- w, w*, The fourth pair of nerves.
- x*, The ſixth pair of nerves in the receptacle, with the double root of the intercoſtal nerve which goes from it.
- X*, The fifth pair of nerves in the cavity of the cranium.
- y*, The firſt branch of the fifth pair of nerves.
- z*, The frontal branch of the firſt branch *y*, of the fifth pair of nerves, divided into two branches.
 1. The naſal branch of the firſt branch *y*, of the fifth pair of nerves.
 2. Small ciliary branches of branch 1. paſſing along the optic nerve.
 3. A ſmall branch inſerted into one of the two twigs 2. which ariſes from the naſal nerve aſcending to the outer ſide of the optic nerve, below the upper faſciculus.
 4. The lacrymal branch of branch *y*.
 5. The ſecond branch of the fifth pair of nerves.
 6. The third branch of the fifth pair of nerves.

TABLE

TAB. 74.

Fig. 3.

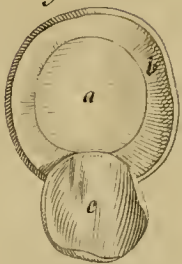


Fig. 2.



Fig. 8.



Fig. 9.

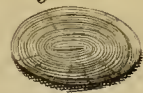


Fig. 12.



Fig. 10.

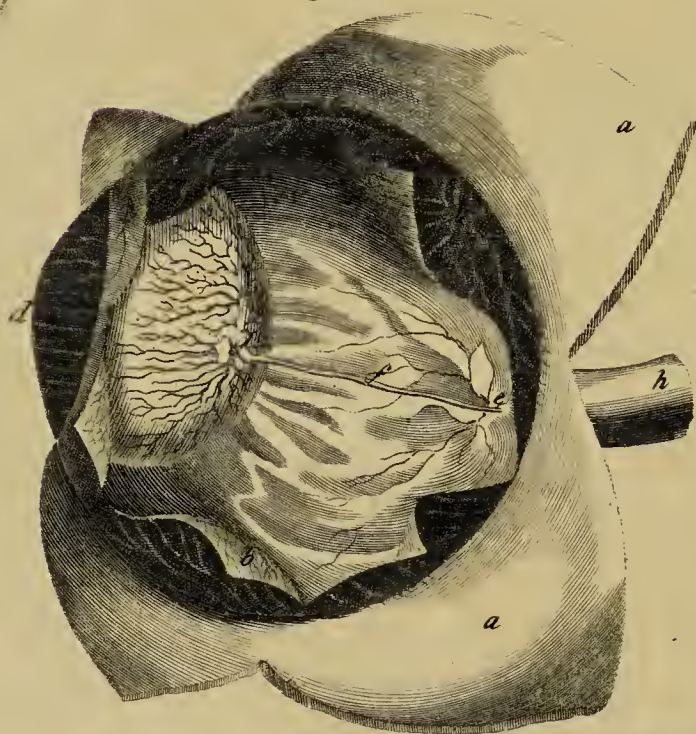


Fig. 6.



Fig. 5.



Fig. 7.



Fig. 1.

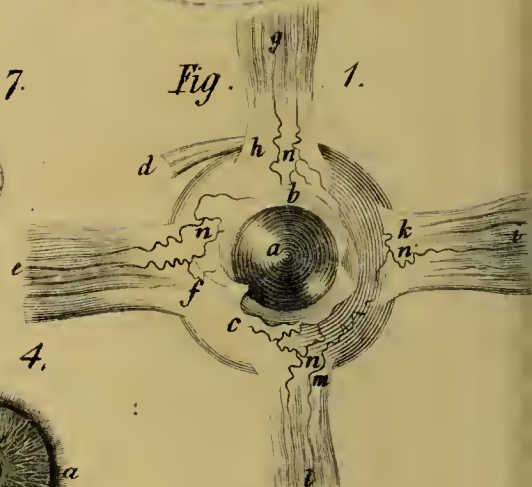


Fig. 4.

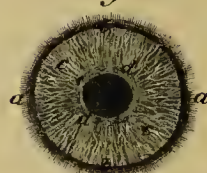


Fig. 11.



Fig. 13.

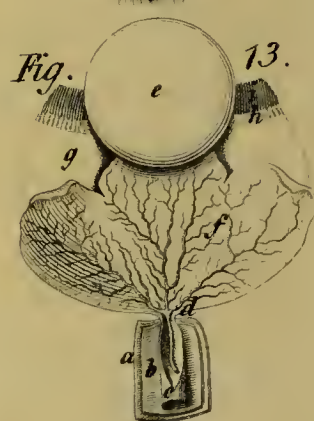


Fig. 14.

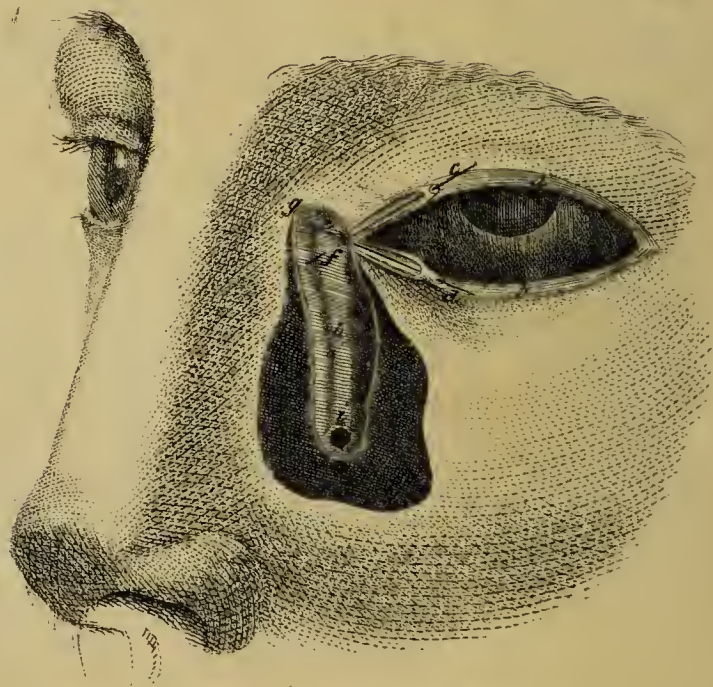


Fig. 15.

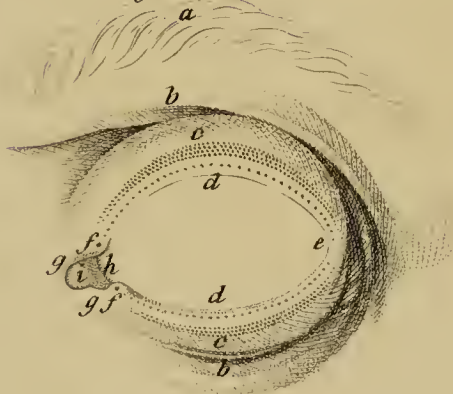


Fig. 16.



Fig. 17.

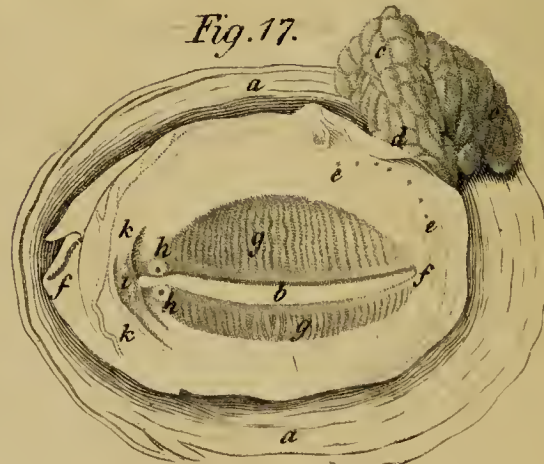
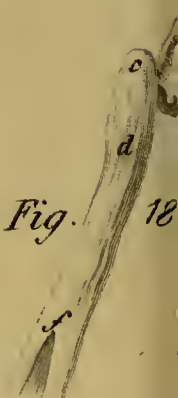


Fig. 18.



T A B L E LXXIV.

The EYE and LACRYMAL ORGANS Dissected.

FIG. 1.

The Anterior Half of the LEFT EYE-BALL, with the Insertions of the Four RECTI MUSCLES, and of the OBLIQUUS SUPERIOR.

- a*, The cornea.
- b*, The remains of the conjunctiva.
- c*, The sclerotis.
- d*, The tendon of the obliquus superior passing behind the rectus superior, to be inserted into the back part of the sclerotis.
- e*, The muscular part of the rectus internus;
- f*, Its tendon inserted into the fore-part of the sclerotis.
- g, h*, Similar parts of the rectus superior.
- i, k*, ————— externus.
- l, m*, ————— inferior.
- n*, &c. Arterious twigs penetrating the tendons of the recti muscles.

FIG. 2.

The EYE Dissected.

- a*, The optic nerve.
- b, b*, Part of the sclerotic coat cut longitudinally, and turned outwards.
- c*, Part of the sclerotic coat cut transversely, and turned forwards with.
- d*, The cornea.
- e, e*, Half of the iris in its natural situation.
- f*, The pupil and crystalline lens.
- g, g*, The ciliary circle.
- h, h*, The choroid coat.
- i*, The ciliary processes, seen in their places, by cutting off a portion of the iris.
- k*, A portion of the iris, cut and turned back.
- l*, The ciliary processes, turned backwards.
- m*, The middle smooth part of the retina, seen by cutting a hole in the choroid coat.
- n*, The roots of the ciliary processes of the retina, to which the black paint of the ciliary processes of the choroid coat adheres.
- o*, The ciliary processes of the retina, inserted into the capsule of the crystalline lens.

FIG. 3.

The CORNEA and MEMBRANA HUMORIS AQUEI.

- a*, The internal or posterior surface of the cornea; and,

b, That of the sclerotica.

c, The membrana humoris aquei, which forms the inner lamina of the cornea, separated and reflected.

FIG. 4.

A View of the Posterior SURFACE of the IRIS.

- a, a*, The inner side of the anterior part of the choroid coat.
- b, b*, The ciliary processes.
- c, c*, The vessels and radiated fibres.
- d, d*, The muscular sphincter of the iris.
- e*, The pupil.

FIG. 5.

The CANALIS FONTANÆ. From the Eye of an Ox.

- a*, Part of the sclerotica.
- b*, The internal surface of the choroides.
- c*, The plicæ of the ciliary processes.
- d*, The iris.
- e*, The pupil.
- f*, The canal of FONTANA.

FIG. 6.

A Section of the COATS at the Bottom of the Eye, to show the CIRCULUS CRIBRIFORMIS CHOROIDEÆ.

- a*, The interior surface of the posterior part of the sclerotic.
- b*, The outer, and,
- c*, The inner surface of the choroides.
- d*, The circulus cribriformis, or lamina cribrosa, through the foraminula of which the medulla of the optic nerve passes to form the retina.
- e*, The retina with its blood-vessels.

FIG. 7.

The CRYSTALLINE LENS, as it appears after Maceration in Water.

FIG. 8.

The LAMINA of the LENS of an Ox indurated in Nitrous Acid, by which most Subtile Fibres are seen running from the one Extremity of the Lens to the other.

FIG.

FIG. 9.

An Internal SECTION of the LENS which was boiled, and afterwards macerated in an Acid, and divided transversely at the Axis, to shew distinctly the Lamellated appearance.—This from the Eye of an Ox.

FIG. 10.

The EYE of a Fœtus Magnified, and the SCLEROTIS, CHOROIDES, and RETINA, turned aside, to shew the ARTERIA CENTRALIS RETINÆ, shining through the Vitreous Humour.

- a, a,* The sclerotic coat.
- b, b,* The choroid coat, with the venæ vorticose on its outer, and retina on its inner side.
- c,* The ciliary circle.
- d,* The iris and membrana pupillaris, with their blood-vessels.
- e,* The entrance of the arteria centralis, at the bottom of the eye, with the branches it gives off to the Retina.
- f,* The course of the artery through the axis of the vitreous humour.
- g,* The division of this artery into branches, and the minute ramifications of these upon the back part of the capsule of the crystalline lens.
- h,* The optic nerve.

FIG. 11.

The ARTERIES of the VITREOUS HUMOUR, and CAPSULE of the LENS, much magnified, in a Fœtus of the seventh Month.

- a, a,* A portion of the vitreous humour.
- b,* The trunk of the arteria centralis retinæ cut off near its entrance into the ball of the eye.
- c,* Branches of the arteria centralis running to the membrane and cells of the vitreous humour. The rest are branches of the arteria centralis, which go from the circumference of the lens to the anterior and posterior surfaces of its capsule. The branches are broken off which went to the membrana pupillaris.

FIG. 12.

The ANTERIOR SURFACE of the MEMBRANA PUPILLARIS in a Fœtus of six Months, with the Arteries injected. The PALPEBRÆ are opened. The Vascular nature of the Membrana Pupillaris, with its Retiform and Anastomosing Appearances, are distinctly seen; the Figure being magnified upwards of two diameters.

FIG. 13.

The VENA CENTRALIS RETINÆ. The VIEW is taken from a CHILD of two years. and magnified. The RETINA is divided, and the VITREOUS HUMOUR so placed, that the Cohesion betwixt the two at one part remains entire.

- a,* The outer, and,
- b,* The inner layer of the vagina of the optic nerve.
- c,* The optic nerve so dissected, that the vena centralis is seen perforating the vagina, and running in the centre of the nerve.
- d,* The vena centralis, dividing into three branches, which run in form of a net-work, upon the inner side of the retina, and unite with the veins of the corpus ciliare.
- e,* The vitreous humour which conceals the progress of the venæ retinæ in the region of the corpus ciliare.
- f,* The retina separated from the vitreous humour and corpus ciliare, and reflected.
- g,* The choroid coat divided and spread out, the vessels of which are not represented in this Figure.
- h,* The ciliary processes.
- i,* The iris also spread out.

FIG. 14.

Shews the LACRYMAL SAC and DUCTS laid open.

- a,* The upper,
- b,* The under eye-lid.
- c, d,* Bristles introduced into the two puncta lacrymalia, and the ducts from them cut open.
- e, f,* The termination of these ducts in the lacrymal sac.
- g, h, i,* The lacrymal sac and nasal duct laid open.
- i,* The termination of this duct in the nose.

FIG. 15.

A Fore-view of the EYE-LIDS of the LEFT SIDE, in a YOUNG MAN, open.

- a,* The eye-brow.
- b, b,* Plaits or folds in the eye-lids which are here widely opened.
- c, c,* Holes in the skin, from which the eye-lashes are pulled.
- d, d,* The openings of the sebaceous glands of the eye-lids.
- e,* The outer angle of the eye.
- f, f,* The puncta lacrymalia.
- g, g,* The two limbs of the inner angle of the eye.
- h,* The valvula semilunaris.
- i,* The caruncula lacrymalis.

FIG. 16.

Shews the particular Situation of the LACRYMAL GLAND, and the form of the PASSAGES for the TEARS.

- a,* The lacrymal gland; its natural situation shewn with respect to the eye-lids.
- b, b,* The two eye-lids widely opened.
- c, c,* The puncta lacrymalia.
- d, d,* The lacrymal ducts.
- e, e,* A blind sac in each of the ducts.
- f,* The termination of the ducts in the lacrymal sac.
- g, g,* The

- g, g,* The lacrymal sac.
b, Part of the nasal duct continued from the sac.

FIG. 17.

The EYE-LIDS of the RIGHT SIDE separated, seen from behind, with the LACRYMAL GLAND turned up.

- a, a,* A portion of the orbicularis oculi.
b, The opening of the eye-lids.
c, c, The lacrymal gland seen from below, divided into two principal lobes, and very little covered by the conjunctiva.
d, The situation of the excretory ducts of the lacrymal gland.
e, e, The external openings of these ducts upon the conjunctiva.

- f,* The conjunctiva.
g, g, The sebaceous glands of the eye-lids, shining through the conjunctiva.
h, h, The puncta lacrymalia.
i, The caruncula lacrymalis.
k, k, The valvula semilunaris.

FIG. 18.

The LACRYMAL SAC and DUCTS separated from the EYE and NOSE, and viewed obliquely towards the right side.

- a,* The lacrymal duct of the upper eye-lid.
b, ————— under eye-lid.
c, d, f, The lacrymal sac and duct; *c, d,* the sac; *d, f,* the duct.
f, The opening where the duct terminates in the nose.

T A B L E LXXV.

VIEWS of the COATS and HUMOURS of the EYE.

FIG. 1.

The Anterior Half of the EYE-BALL, quite recent, divided perpendicularly without any Injection.

- a*, The edge of the sclerotis, lined with a blackish mucus.
- b*, The choroides, lined with the proper pigmentum nigrum.
- c*, The retina;
- d*, Its anterior termination, according to the author of the figure.
- e*, The ciliary processes shining through the remains of the vitreous humour.
- f*, The iris.
- g*, The pupil.

FIG. 2.

The Posterior Half of the same EYE.

- a, b*, As in the first figure.
- c*, The outer surface of the retina.
- d, d, e, f*, The inner surface of the retina.
- e*, A round white spot which marks the entrance of the optic nerve.
- d, d, e*, Three branches of the central artery, which penetrate the eye-ball along with the optic nerve.
- d, d*, Two of these which form a circle round the central hole in the retina.
- e*, The true middle, or central point of the retina, on which several plaits or folds of that substance meet, and conceal the central hole and its yellow border.

FIG. 3.

The Under Half of the RIGHT EYE-BALL divided horizontally, quite recent.

- a*, The sclerotis.
- b*, The cornea.
- c*, The union of the sclerotis with the cornea.
- d*, The concave side of the cornea.
- e*, The choroides, with the pigmentum nigrum lining it.
- f*, The lens.

g, The ciliary processes.

h, The iris.

i, The retina.

k, The optic nerve divided.

l, m, The coats of the nerve.

n, Traces of the central artery which penetrates the nerve.

FIG. 4.

The Posterior View of the RETINA; the SCLEROTIS and CHOROIDES being removed.

- a*, The central hole in the middle point of the retina surrounded by a yellow border;
- b*, The point where the optic nerve is cut off, not above half the size of that near the brain.
- c, c*, The central vessels of the retina.

FIG. 5.

Anterior View of the same.

- a, b*, The retina; *b*, its anterior termination, according to the author of the figure.
 - c*, The ciliary processes.
 - d*, A ring round the lens, formed by the membranes of the vitreous humour.
 - d, e*, The lens in its capsule.
 - e*, The central hole in the retina, seen through the lens and vitreous humour.
- The vessels of the retina appear also through the humours.

FIG. 6.

A View of the Exterior Side of the RETINA.

- a, b, c*, The retina.
- b*, The central hole surrounded with its yellow border.
- c*, The apparent termination of the retina.
- d*, The optic nerve denuded of its coats.
- e, e*, Two principal twigs of the central vessels of the retina.
- f*, The ciliary processes.
- g, b*, The lens in its capsule; *g*, the portion which rises

Fig. 2.



Fig. 3.

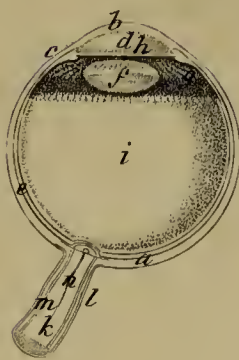


Fig. 1.

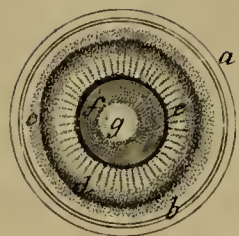


Fig. 15.



Fig. 14.



Fig. 13.



Fig. 5.



Fig. 6.

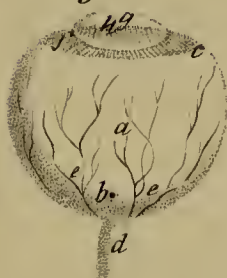


Fig. 4.

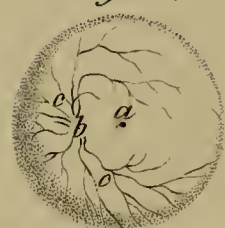


Fig. 16.



Fig. 8.

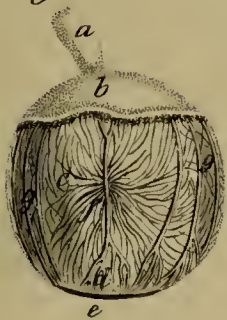


Fig. 9.

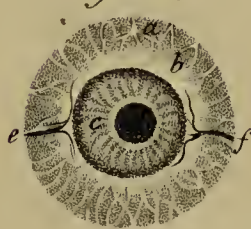


Fig. 7.

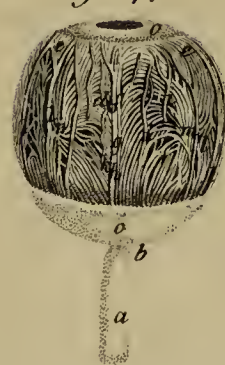


Fig. 19.



Fig. 18.

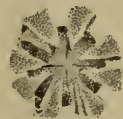


Fig. 17.



Fig. 12.



Fig. 11.



Fig. 10.



rises above the ciliary processes; *b*, the portion seen through the ciliary processes.

FIG. 7.

The CHOROIDES of the LEFT EYE-BALL injected, and viewed from the Nasal Side.

- a, b*, The optic nerve; *b*, its contraction before its conversion into the retina.
- c*, The remains of the sclerotis.
- d, e, e*, The choroides.
- f, g, h*, The long internal ciliary artery, vein, and nerve.
- i, i*, Longer and shorter arteries of the choroides.
- k, k*, The nerves of the iris accurately delineated.
- l, m, n*, Venæ vorticosæ.
- o*, The iris and pupil.

FIG. 8.

The LEFT EYE seen from below.

- a*, The optic nerve.
- b*, The sclerotis.
- c*, The choroides.
- d*, The ciliary ligament, with numerous nerves in it dividing into branches.
- e*, The edge of the iris.
- f*, The inferior vena vorticosa.
- g, g*, The ciliary nerves.

FIG. 9.

The Anterior Surface of the CHOROIDES and IRIS.

- a*, The choroides; the letter is placed on its under side.
- b*, The ciliary ligament.
- c*, The iris, smaller next the cheek.
- d*, The pupil.
- e*, The long internal, and,
- f*, The long external ciliary artery. The white lines represent the ciliary nerves.

FIG. 10.

The Posterior or Inner Surface of the Anterior Half of the CHOROIDES, divided perpendicularly.

- a*, The pupil.
- b*, The iris covered with its pigmentum nigrum.
- c*, The choroides.
- d*, The ciliary processes; their anterior edges projecting over and concealing the outer edge of the iris.

FIG. 11.

The Anterior Surface of the Anterior Half of the CHOROIDES of a seven-month Fœtus. The ARTERIES and VEINS are filled with Vermilion.

- a*, The internal, and,
- b*, The external long ciliary artery.
- c*, The iris.
- d*, The membrana pupillaris, with its vessels injected.

FIG. 12.

The Anterior Portion of the CONJUNCTIVA and CORNEA of the LEFT EYE of a six-month Fœtus, with its Blood-vessels filled with Vermilion, and magnified twice its natural Size; shewing the great degree of Vascularity at this age.

- a*, The cornea.
- b*, The conjunctiva, with its injected vessels.

FIG. 13.

The LENS of a new-born Child in Profile

FIG. 14.

The LENS of a Child six years old in Profile.

FIG. 15.

The LENS of an Adult in Profile.

FIG. 16.

The LENS coagulated by Alcohol, and then divided. It is opaque and lamellated.

FIG. 17.

The LENS rendered opaque, being kept in Alcohol, and burst on its Posterior Surface into unequal Portions.

FIG. 18.

A LENS which broke into eight Segments, and these divided into LAMINÆ.

FIG. 19.

Three LAMINÆ of one of these Segments more carefully separated, but all this artificial.

TABLE

TABLE LXXVI.

VIEWS of the MUSCLES, VESSELS, NERVES, COATS, and HUMOURS of the EYE.

FIG. 1.

Shews the Distribution of the RIGHT OCULAR ARTERY, as it appears when the MUSCLES remain connected with the EYE, except the LEVATOR PALPEBRÆ and LEVATOR OCULI, which are cut and turned back.

- a*, The inner, *b*, the outer, and, *c, c*, the under edge of the orbit.
- d*, The canal of the optic nerve.
- e*, The levator palpebræ, cut and turned back.
- f, g*, The levator, *h*, the adductor, and, *i*, the abductor oculi.
- k, k*, The optic nerve.
- l*, The eye-ball.
- m*, The cerebral artery.
- n, o*, The ocular artery; *o*, its flexure.
- p*, The long ciliary arteries.
- q*, The lacrymal artery.
- r*, The continuation of the ocular artery which crosses the optic nerve.
- s*, A branch from the inner maxillary artery.

FIG. 2.

The same View with the former, except that the EYE-BALL and OPTIC NERVE are removed.

- a, b, c*, The orbit.
- d*, The canal of the optic nerve.
- e*, The musculus trochlearis; *f*, its trochlea.
- g*, The depressor, *h*, the adductor, and, *i*, the abductor oculi.
- k*, The obliquus inferior.
- l*, The first long ciliary artery.
- m*, Another long ciliary artery.
- n*, The lacrymal artery.
- o*, The continuation of the ocular artery.
- p*, The trunk of the internal maxillary artery.
- q*, The under orbicular artery, a constant branch.

FIG. 3.

The VEINS of the BALL and MUSCLES of the LEFT EYE.

- a, b, c, c*, The orbit.

- d*, The eye-ball.
- e*, The optic nerve.
- f, f*, The levator palpebræ.
- g*, The levator oculi.
- h*, The insertion of the trochlearis; *i*, its pulley.
- k, l*, The abductor, and, *m*, the depressor oculi.
- n*, The lacrymal gland a little displaced, and part of it removed.
- o*, The cerebro-ocular vein.
- p*, The fronto-ocular vein.
- q*, Anastomoses with the internal ocular vein.
- r*, A branch, consisting of the under external ciliary vein, and anastomosing twig of the posterior cerebro-ocular vein.
- s*, The anterior ciliary vein.
- t*, The external ciliary vein.
- u*, The termination of the cerebro-ocular vein, with the fronto-ocular vein, after winding round the optic nerve.
- v*, The fronto-ocular vein communicating with,
- w*, The frontal, and with,
- x*, The palpebral vein.
- y*, The vena centralis retinae.

FIG. 4.

A View of the VEINS below the EYE, after the EYE-BALL has been raised and turned back.

- a*, The cut end of the trochlearis.
- b*, The adductor oculi.
- c, c*, The depressor oculi divided.
- d*, The obliquus inferior.
- e, f*, The anterior and posterior roots of the cerebro-ocular vein, with branches from the adjacent parts.
- g*, A short ciliary, and,
- h*, A long ciliary vein.
- i*, Anastomosis between the fronto-ocular and the posterior root of the cerebro-ocular vein.
- k*, The single under ciliary vein.
- l*, A communicating branch formed by the posterior and anterior cerebro-ocular veins, which unite with,
- m*, The internal frontal vein.
- n*, The under external ciliary vein.
- o*, The facial vein, receiving,
- p*, The external palpebral vein.

FIG.

Fig. 1.

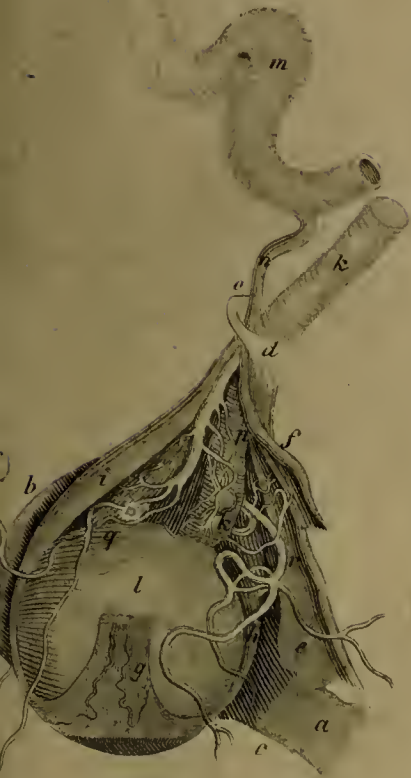


Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.

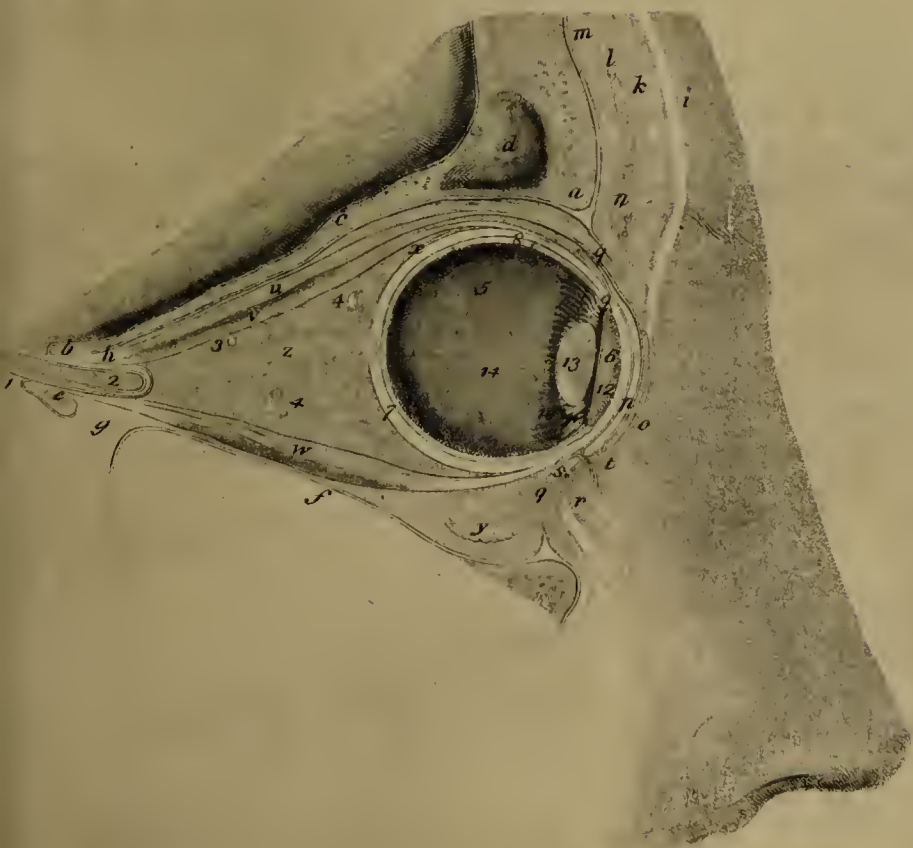


Fig. 9.



FIG. 5.

Shews the NERVES of the RIGHT EYE in their natural situation in a young Man of eighteen years of age.

- a*, The optic nerve.
- b*, The nerve of the third pair.
- c*, ————— fourth pair.
- d*, ————— fifth pair.
- e, e*, ————— sixth pair, with its termination on the abductor oculi.
- f*, The cerebral end of the fifth pair, which terminates conically in,
- g*, A ganglion.
- h*, The first branch of the fifth pair.
- i*, The second, passing through the foramen rotundum.
- k*, The third, going through the foramen ovale.
- l*, The connection of the first branch of the fifth pair with the fourth pair.
- m*, The frontal branch of the first branch of the fifth pair, sending off,
- n*, The lacrymal nerve, and afterwards proceeding by different branches to the forehead.
- o*, A branch of the facial nerve, which penetrates through the os malæ into the orbit.
- p*, A nerve to the nose.
- q*, The nervus trochlearis.
- r*, The levator palpebræ.
- s*, The levator, *t*, the depressor, *u*, the adductor, and, *v*, the abductor oculi.
- w*, The trochlearis; *x*, its trochlea.
- y*, The lacrymal gland.

FIG. 6.

Shews chiefly the Division of the FIFTH PAIR of NERVES, and the Formation of the CILIARY GANGLION.

- a*, The levator oculi inverted.
- b*, The levator palpebræ.
- c*, The third pair of nerves.
- d*, A small branch going off before its entrance into the orbit; connected, at *e*, with the branches of the fifth pair, forming the ciliary ganglion.
- f*, The principal inferior branch of the third pair.
- g*, The ciliary ganglion, from which are sent off two bundles of ciliary nerves; the upper bundle, *h*, divides into three branches, which run along the optic nerve, and divide into six or more threads of unequal thickness, of which three are here seen penetrating the sclerotis.
- i*, A branch from the principal branch of the third pair going to the obliquus inferior.
- k*, Branches to the depressor oculi.
- l*, The branch of the third pair to the levator oculi.
- m*, ————— palpebræ.
- n*, The fifth pair, with its ganglion.

- o*, The first branch of the fifth pair.
- p*, The lacrymal nerve.
- q*, The slender branch of the frontal nerve.
- r*, The proper frontal nerve.
- s*, A twig from the first branch of the fifth pair to the ciliary ganglion.
- t, u*, The sixth pair; *u*, its termination in the adductor oculi.

FIG. 7.

The NERVES seen directly under the DEPRESSOR OCULI the Nasal Part of the FIFTH PAIR, and the whole SIXTH.

- a*, The fifth pair reflected.
- b*, The ganglion of the fifth pair.
- c*, The first,
- d*, The second, and,
- e*, The third branch of the fifth pair.
- f*, The smaller portion of the fifth pair, bending to join the third branch.
- g*, The small branch corresponding with *d*, of Fig. 6. which, after receiving,
- h*, Similar to *e*, of Fig. 6. is cut across.
- i*, Two long ciliary nerves running upon the optic nerve.
- k*, A branch from these, which, under the levator oculi, splits, sends a nerve to the nose, and then forms the nervus trochlearis.
- l*, The ciliary ganglion.
- m*, Branches from the third pair to the depressor oculi.
- n*, The branch from the third pair to the obliquus inferior.
- o*, The frontal branches of the first of the fifth pair cut across.
- p*, The sixth pair.
- q*, Twigs from the sixth pair, which form a rete along the internal carotid artery, in its passage through the base of the skull.
- r*, The termination of the sixth pair on the abductor oculi.

FIG. 8.

Represents the RIGHT EYE, when covered by the EYE-LIDS, after a perpendicular Incision from before backwards.

- a, b*, The upper part of the orbit.
- c*, The inner side of the cranium covered by the dura mater.
- d*, The right frontal sinus.
- e, b*, The canalis opticus.
- f*, The under side of the orbit.
- g*, A cavity filled with fat, &c.
- h*, The connection between the dura mater, the sheath of the optic nerve, and the origin of the levatores oculi et palpebræ.
- i*, The skin of the forehead.

k, The

- l*, The fat.
l, The occipito-frontalis;
m, The fat under it.
n, The corrugator supercilii, before which are sections of a vein, an artery, and a hair of the supercilium, with the orbicularis muscle.
o, The upper eye-lid shut upon the eye.
p, The tarsus or cartilage of the upper eye-lid.
q, q, The boundary of the tunica adnata.
r, The under eye-lid and orbicularis muscle.
s, The tarsus of the under eye-lid.
t, The openings of the eye-lids, with the eye-lashes.
 At the inner edge of the eye-lids is seen a small triangular opening, by which the tears pass towards the nose when the eye-lids are shut.
u, The levator palpebræ.
v, ———— oculi.
w, The depressor oculi.
x, The tendon of the trochlearis.
y, The belly of the obliquus inferior.
z, The optic nerve surrounded with fat, and contracting where it enters the eye.
 1. The outer and inner layers of the sheath of the nerve.
 2. A section of the nerve.
 3. A section of the ocular artery.
 4. Sections of the vein.
 5. The eye-ball.
 6. The cornea and anterior chamber.
 7. The sclerotica becoming gradually thinner towards its fore-part; its anterior edge forming a groove to receive the edge of the cornea.
 8. The choroides.
 9. The ciliary ligament.
 10. The corpus ciliare.
 11. The ciliary processes.
 12. The iris and pupil.
 13. The lens in its capsule. The dark space between the lens and iris is the posterior chamber.
 14. The retina seen through the vitreous humour.

FIG. 9.

Is nearly the same as Fig. 8. except that the Eye-lids are open, by which the Cornea appears more prominent, the Lens is removed, the Sheath of the Optic Nerve is slit open its whole length, the Vessels of the Choroid Coat, and the Ciliary Processes, are distinctly seen.

OF THE NOSE.

THE Nose, which constitutes the *Organ of Smell*, and contributes to the general purpose of Respiration, is divided into the External Prominent Part, and the Internal Cavity, which is separated by the Septum Narium into two smaller Cavities;—or, it is divided into Hard and Soft Parts.

The External Part, or Nose, properly so called, is composed superiorly of Bones, inferiorly of Cartilages, and has a partial Covering from the Muscles, and a general one from the common Integuments.

On the outside of the Nose are observed,—the *Radix*, or upper part;—the *Dorsum*, or middle prominence;—the *Apex*, or point;—the *Alæ*, or lateral moveable parts;—and *Columna*, or under part of the Partition next the Upper Lip.

The Osseous Part of the Nose is formed by the *Ossa Nasi*, the *Ossa Maxillaria*, and *Os Frontis*, which form the upper and fore part:

By the *Os Ethmoides* and *Ossa Unguis*, which form the upper, inner, and lateral parts:

And by the *Ossa Maxillaria Superiora*, *Ossa Palati*, *Os Sphenoides*, *Ossa Spongiosa Inferiora*, and *Vomer*, which form the under, inner, and back part.

The two Cavities, or Nostrils, terminate anteriorly in the Face, and posteriorly in the Fauces, and are much enlarged by the different Sinuses which communicate with them.

The under and fore part of the Nose consists of Five Cartilages, of a somewhat regular figure, and of some smaller pieces, which are more irregular and of an indeterminate number.

Of the Five Cartilages, one is situated in the middle, and the other four laterally.

The middle Cartilage is the most considerable, and supports the rest: It constitutes the Cartilaginous part of the Septum Narium, and is joined to the anterior edge of the Nasal Lamella of the Ethmoid Bone, to the anterior edge of the Vomer, and to the fore-part of the Spinous Process of the Superior Maxillary Bones.

Of the lateral Cartilages, two are placed anteriorly, forming by their curved union the Tip of the Nose; and two posteriorly, which form the *Alæ Nasi*.

Between the anterior and posterior Cartilages, are Spaces filled with the additional Cartilages, the number, size, and figure, varying in different bodies. Tab. LXX. Fig. 6. 4.

The Elasticity of the Cartilages contributes to the defence of the Nose against external injuries.

The Nose is covered by the common Integuments, and perforated at its under and outer part by the Ducts

of Sebaceous Glands, the contents of which may be readily squeezed out by the pressure of the Fingers.

The Cartilages of the Nose are moved in different directions, by the following Muscles on each side, which have been already described, viz. the *Compressor Narium*, the *Nasal* part of the *Frontal* Muscle, and the *Levator* and *Depressor Labii Superioris Alæque Nasi*.—The Nose may also be moved by the neighbouring Muscles, which, in many instances, become assistants to the others.

The Internal Nares or Cavities of the Nose extend upwards to the Cribriform Plate of the Ethmoid, and to the Body of the Sphenoid Bone.

At the inner side, they are bounded by the Septum Narium, which is formed by the Nasal Lamella of the Ethmoid Bone, by the Vomer, and by the middle Cartilage of the Nose. Tab. XIII. Fig. 2. F, G, H, I.

On the outside, or that next the Cheek, the *Ossa Spongiosa* project a considerable way into the Cavities of the Nares, and increase the Surface of the Membrane of the Nose, for enlarging the Organ of Smell; and in Animals which smell acutely, the *Ossa Spongiosa* are remarkably large and complex. Tab. XIII. Fig. 1. s, t.

The bottom of the Nostrils runs directly backwards, so that a straight Probe may be passed through either of them to the Throat.

In the fore-part of the Nostrils there are stiff Hairs, called *Vibrissæ*, which prevent the Mucus from constantly flowing out, and insects, or other extraneous matter, from entering.

The general Cavity of each Nostril is divided by the *Ossa Spongiosa* into three *Meatus*, or *Passages*, which run from before backwards, and are described by HALLER according to their situations, viz.

The *Meatus Narium Superior*, placed at the upper, inner, and back part of the Superior Spongy Bone. Tab. XIII. Fig. 1. between K and L.

The *Meatus Medius*, situated between the Superior and Inferior Spongy Bones. Tab. XIII. Fig. 1. o, p. and,

The *Meatus Inferior*, situated between the Inferior Spongy Bone and Bottom of the Nose. Tab. XIII. Fig. 1. s, t.

The inside of the Nose is lined with a thick Spongy Substance, termed *Membrana Mucosa*, or *Membrana Pituitaria* of SCHNEIDER, or *Membrana Schneideriana*, which is also continued to the different Sinuses, to the Lacrymal Sacs, and Palatine Ducts, to the Pharynx, Palate, and Eustachian Tubes.

This Membrane is very *Vascular* and *Nervous*, and is the

the Primary Organ of Smelling. It is constantly lubricated and preserved in a proper degree of moisture by the *Mucus* of the Nose, which is discharged from numerous small Follicles, every where dispersed over the Surface of that Membrane.

The *Passages* of the different *Sinuses* of the Bones of the Head, after having run obliquely backwards in a short winding direction, terminate by small Openings in the Cavity of the Nose.

The *Frontal Sinuses* send Passages downwards into the anterior Ethmoid Cells, which terminate in the upper part of the Nose, behind the beginning of the Lacrymal Sacs. Tab. XIII. Fig. 3. B.

Besides the Passages common to the Frontal Sinuses and anterior Ethmoid Cells, there are others proper to the posterior Ethmoid Cells, which terminate in the upper and back part of the Nose, near the Openings of the Sphenoid Sinuses.

The *Sphenoid Sinuses* open, behind the Cells of the Ethmoid Bone, into the upper and back part of the Nose. See Fig. with Nerves of Nose, Vol. III.

The *Maxillary Sinuses* open at their upper and inner sides, each by one, and sometimes by two Passages, into the middle of the space between the Superior and Inferior Spongy Bones, nearly opposite to the under edge of the Orbit. Tab. XIII. Fig. 1. q.

At the upper part of the Maxillary Sinuses, *Appendices*, described by HALLER, are sometimes found, which communicate with the Ethmoid Cells. Tab. XIII. Fig. 3. G.

The Sides, or Walls of the Maxillary Sinuses, are formed of thin Plates of Bone, excepting where the Processes project and give them additional strength; and below, the Bone is so thin between them and the Dentes Molares, that the roots of these Teeth are sometimes found to perforate the Septum.

The different Sinuses are lined with a continuation of the *Membrana Schneideriana*; but in these it is thinner, and less Vascular and Nervous, than that part of it which lines the general Cavity of the Nose.

They are constantly moistened, but not filled with a Fluid.

The Sinuses increase and modulate the voice: Their hollow structure renders the Bones lighter; but they do not appear to constitute part of the Organ of Smell.

Their Passages being directed backwards, prevent extraneous matter from getting into them.

Lacrymal Groove.—This is formed by the Superior Maxillary, Lacrymal, and Inferior Spongy Bones. In its descent, it runs a little obliquely backwards to the lower and lateral part of the Cavity of the Nose, where it terminates at the inner and fore part of the Antrum Maxillare, under the Os Spongiosum Inferius, a little

behind the anterior extremity of that Bone, and in a direct line upwards from the second Dens Molaris. Tab. IV. No. 8. y.

The upper part of the Groove forms only a semicanal, the under end a complete one.

The *Lacrymal Sac* is a Membranous Canal, situated in the upper part of the Lacrymal Groove, behind the Tendon of the Orbicularis of the Eye-lids; about a fourth part of it above the Tendon, and forming a kind of Intestinum Cæcum, and the rest below it. Tab. LXXIV.

Towards the inner Angle of the Eye, behind the Tendon of the Orbicularis, the Sac is perforated by the Lacrymal Ducts.

The lower part of the Sac becoming a little narrower, but without forming any Valve, passes into the Nose, under the name of *Canalis Nasalis*, *Ductus ad Nasum*, or *Lacrymal Duct*, and terminates at the inferior extremity of the Osseous Canal. Tab. IV. No. 8. y.

The Structure of the Lacrymal Sac and Duct is similar to that of the *Membrana Schneideriana*. They are defended by the same kind of Mucus with which this Membrane is lubricated, and are firmly connected to the Periosteum of the Osseous Canal.

The Use of this Passage is,—to convey the superfluous Tears to the Nose, so as to prevent them from passing over the Cheek.

The *Ductus Incisivus*, vel *Nasalo-Palatinus* of STENO, is a small Canal, which, as has been already observed in the description of the Bones, is only sometimes met with in the Human Body, though it is always to be found in the Ox, Horse, Sheep, &c.

When present, it takes its Origin from a small Pit, formed in the fore-part of the bottom of the Nostril, under the termination of the Lacrymal Duct. It runs obliquely downwards and forwards, placed in such a manner as to receive and conduct the Tears into the Mouth. Tab. LXX. Fig. 7. g.

The *Arteries* of the Nose come chiefly from the External Carotids.

Those of the outer part of the Nose come from the Facial and Internal Maxillary Arteries;—those of the inner from the Internal Maxillary; and a few Twigs are furnished by the Ocular Arteries.

The *Veins* go to the External Jugulars. They likewise communicate with the Ocular Veins, and of course with the Lateral Sinuses and Internal Jugulars.

The *Nerves* with which the outer part of the Nose is chiefly supplied, come from the second Branch of the Fifth, and from the Portio Dura of the Seventh Pair.

The inner part is principally supplied by the First Pair, or Olfactory Nerves, and by some Branches from the first and second portion of the Fifth Pair.

OF THE EAR.

THE EAR, or Organ of Hearing, is divided into *External* and *Internal Ear*.

EXTERNAL EAR.

The *External Ear* comprehends the *Auricle*, or *Ear*, properly so called, and the *Meatus Auditorius Externus*.

It is again divided into the *Pinna*, or *Ala*, Tab. LXXVII. Fig. 1. *a, a, a*, to *b*, which constitutes by much the greater part of it, and *Lobus*, which is placed at its under end. Tab. LXXVII. Fig. 1. *c*.

The *Pinna* is chiefly composed of Cartilage, and is divided, at its fore-part, into several *Eminences* and *Cavities*, which have received particular names, viz.

The *Helix*, or outer Bar, or Margin, which arises behind, at the Lobe of the Ear, surrounds its upper edge, and terminates below, nearly opposite to its origin; dividing the *Concha* into two parts. Tab. LXXVII. Fig. 1. *a, a, a*.

The *Antihelix*, *Anthelix*, or inner Bar or Margin, which is situated within the former, and is composed superiorly of two Ridges, uniting together below. Tab. LXXVII. Fig. 1. *b, b*.

The *Tragus*, which is a small eminence lying over the *Meatus Externus*, and is connected to the under and fore part of the *Helix*. Tab. LXXVII. Fig. 1. *c*.

The *Antitragus*, placed below the posterior extremity of the *Antihelix*. Tab. LXXVII. Fig. 1. *d*.

The *Cavitas Innominata*, situated between the *Helix* and *Antihelix*. Tab. LXXVII. Fig. 1. *f, f*.

The *Scapha*, or *Fossa Navicularis*, situated between the two limbs of the *Antihelix*. Tab. LXXVII. Fig. 1. *g*.

The *Concha*, which is a large Cavity under the *Antihelix*; divided by the *Helix* into two parts, the inferior of which leads to the *Meatus Auditorius*. Tab. LXXVII. Fig. 1. *b, b*.

The back-part of the *External Ear* exhibits only one considerable *Eminence*, which is the convex Surface of the *Concha*. Tab. LXXVII. Fig. 2. *b, b*.

The *Lobus*, which is the inferior soft part of the Ear, is composed of Cellular Substance, with a small quantity of Fat.

The Ear is covered by a continuation of the common Integuments, which is thinner here than on the rest of the Body, and is perforated in many parts by the mouths of Sebaceous Ducts placed immediately under the Skin.

The motions of the ear, which are very limited, are regulated by several *Muscles*, some of which are common to the Ear and Head, and others proper to the Ear itself. The former have been already described. The latter lie close upon the Cartilage, and, in the generality of Subjects, are so thin, white, and indistinct, as to receive from some Authors the name of *Muscular Membranes*.—They are as follow.

HELICIS MAJOR.

Origin: From the anterior acute part of the *Helix*, upon which it ascends.

Insertion: Into the *Helix*. Tab. XVII. Fig. 3. *a*.

Action: To pull that part into which it is inserted a little downwards and forwards.

HELICIS MINOR.

Origin: From the under and fore part of the *Helix*.

Insertion: Into the *Helix*, near the Fissure in the Cartilage opposite to the *Concha*. Tab. LXXVII. Fig. 3. *b*.

Action: To contract the Fissure.

TRAGICUS.

Origin: From the middle and outer part of the *Concha*, at the root of the *Tragus*, along which it runs.

Insertion: Into the point of the *Tragus*. Tab. LXXVII. Fig. 3. *c*.

Action: To pull the point of the *Tragus* a little forwards.

ANTITRAGICUS.

Origin: From the internal part of the *Antitragus*, upon which it ascends.

Insertion: Into the tip of the *Antitragus*, as far as the inferior part of the *Antihelix*, where there is a Fissure in the Cartilage. Tab. LXXVII. Fig. 3. *d*.

Action: To turn the tip of the *Antitragus* a little outwards, and depress the extremity of the *Antihelix*.

TRANSVERSUS AURIS.

Origin: From the prominent part of the *Concha*, on the back part of the Ear.

Insertion:

Insertion: Into the outside of the Antihelix. Tab. LXXVII. Fig. 4. *a*.

Action: To draw the parts to which it is connected towards each other, and to stretch the Scapha and Concha.

The *Cartilage* of the External Ear is connected to the Temporal Bone by the common Integuments, and by its Muscles; and is furnished with Ligamentous Membranes, which fix it to the roots of the Zygoma and of the Mastoid Process. Tab. LXXIX. B. Fig. 4. 5.

The Auricle collects Sound, and conveys it to the Meatus Externus,—the Muscles giving tension to it, so as to render the Sound more distinct.

The *Meatus Auditorius Externus* leads inwards, from the Concha, and in its course proceeds forwards and upwards, turning a little downwards at its farthest extremity, and terminating at the Membrana Tympani, Tab. LXXVII. Fig. 5.—The turns, however, are so inconsiderable, that the bottom of the passage can be readily seen in a clear light, upon pulling the Ear backwards.

It is somewhat of an oval form, a little contracted in the middle, and upwards of an inch in length.

Its outer end, which is a continuation of the Concha, is cartilaginous, and has two or three *Interruptions* or *Fissures* in it. Tab. LXXIX. B. Fig. 3.

On the upper and back part of its circumference, there is a *Large Interruption* terminating in an oblique Margin, which is fixed to the rough edge, at the under part of the Osseous portion of the Meatus. Tab. LXXVII. under part of Fig. 4.

At the upper and back part of the Meatus, the Cartilage has but little connection with the Bones, being there fixed by the Skin which lines the Canal.

The Osseous is continued from the Cartilaginous part of the Canal, and is the longer of the two, particularly at its upper and back part.

The Meatus is lined with a continuation of the Skin, which fills up the Interruptions in the Cartilage, but, like the Skin covering the Auricle, it is thinner than on the rest of the Body. Tab. LXXIX. B. Fig. 5.

Under the Skin of the Meatus, and near its outer end, there are numerous small Glands, of a yellowish colour, placed in a Reticular Substance formed of the Corpus Mucosum, and termed *Glandule Ceruminosæ*, which discharge the Wax of the Ear through small Excretory Ducts. Tab. LXXVII. Fig. 5. *c*.

The Wax lubricates the Passage, and defends it from the injuries of the air, and, being of a viscid and bitter quality, assists in the exclusion of insects.

The *Arteries* of the External Ear come anteriorly from the Temporal, and posteriorly from the Occipital; both of which are Branches of the External Carotid Artery.

The *Veins* pass partly to the External, and partly to the Internal Jugulars.

The *Nerves* which supply the fore-part of the Ear

are derived from the third of the Fifth, and from the Portio Dura of the Seventh Pair. Those which supply the under and back part come from the first and second Cervicals.

The Meatus Externus conveys sound from the Outer towards the Inner Ear, and is supposed to do this to greater advantage on account of the winding nature of the Passage.

In the Fœtus, the Meatus is entirely Cartilaginous, and only adheres to an imperfect Bony Circle, in which the Membrana Tympani is fixed. Tab. LXXIX. B. Fig. 22.

At the inner end of the Meatus Externus, the *Membrana Tympani* is situated, which is firm, almost transparent, and of an oval form.

It is fixed in a *Groove* which divides the Meatus from the Tympanum. Tab. LXXVII. Fig. 6. *d*.

It is very tense, but has a small *Depression* in the middle next the Meatus, with a corresponding *Convexity* towards the Tympanum, where the extremity of the Malleus is fixed to it.

Its situation is somewhat oblique, the upper part being turned outwards, and the under inwards, so that the lower side of the Meatus is a little longer than the upper.

It forms a complete impervious *Septum*, though the contrary has been maintained by some Authors.

It is formed partly of a continuation of the Lining of the Meatus, but chiefly of the Periosteum.

The Membrana Tympani has numerous small *Vessels* from the Temporal and Stylo-mastoid Arteries, which run in a radiated manner, and which are most abundant in the Fœtus.

It is the Conductor of Sound from the Outer to the Inner Ear.

In the Fœtus, this Membrane is fixed in an imperfect Ring of Bone, and, along with the Meatus, is covered with a Mucous Membrane, which defends the Parts from the too strong impulse of Sound. Tab. LXXIX. Fig. 1.

THE INTERNAL EAR.

The *Internal Ear* comprehends the *Tympanum*, *Labyrinth*, and certain *Passages* leading into these.

The *Tympanum* is situated at the inner side of the Membrana Tympani, approaches to a hemispherical figure, and is about half an inch in width. Tab. LXXVII. Fig. 7.—11. Tab. LXXIX. Fig. 15. 16.

Between the Tympanum and Cavity called Labyrinth, there is an *Osseous Septum*, which forms the bottom of the Tympanum, where there are several *Eminences*, viz.

The *Promontory*, which forms the beginning of the Scala Tympani, and divides the Tympanum into anterior and posterior Regions. Tab. LXXVII. Fig. 11. *b*.

A *Protuberance* at the upper and back part of the Tympanum, formed by the Aquæductus FALLOPII.

A *Projection*, called *Eminentia Pyramidalis Tympani*, situated behind the *Fenestra Ovalis*, in which is the Passage for the *Stapedius*.

An *Eminence* at the upper and fore part of the *Tympanum*, containing a semi-canal, for lodging part of the *Tensor Tympani*. Tab. LXXVII. Fig. 11. *b*.

In the *Tympanum* there are various *Passages*, which communicate with the neighbouring parts, viz.

The *Iter a Palato ad Aures*, or *Eustachian Tube*, which goes off from the upper and fore part of the *Tympanum*, and running obliquely forwards and inwards to the posterior Opening of the *Nostril*, terminates at its outer edge, above the Arch of the *Palate*. Tab. LXXIX. B, Fig. 2. G, H, I. Tab. LXXVIII. Fig. 6. *g, b, i*.

The posterior part of the Tube is formed in the *Pars Petrofa*, at the upper and outer part of the Canal for the *Carotid Artery*.

The anterior portion is formed above, by the *Spinous Process*, and root of the *Pterygoid Process* of the *Sphenoid Bone*;—and below, by *Cartilage* and *Membrane*.

It is narrower next the Ear, where it can only admit the point of a Surgeon's Probe, Tab. LXXIXB. Fig. 7. D; but becomes gradually wider towards the Nose, where it terminates by an oblique Opening with prominent sides, sufficiently large to admit a Goose-quill. Tab. LXXIXB. Fig. 6. *i*.

It is lined by a *Membrane* similar to that of the Nose, of which it appears to be a continuation; and which, on the edge of the Mouth of the Tube, is so thick as to add considerably to its prominency.

The *Eustachian Tube* preserves the balance of Air between the Outer and Inner Ear, and prevents it from pressing too forcibly upon the different *Membranes* placed in the sides of the *Tympanum*.

It has been supposed to convey the sound of a Person's own Voice to the Inner Ear; but experiment does not favour this opinion, nor is it found to render Sound more distinct when the Mouth is open;—though Persons who have a degree of deafness are observed frequently to listen after this manner.

The *Cells of the Mastoid Process*, which open into the upper and back part of the *Tympanum*, opposite to, but a little higher than the *Eustachian Tube*. Tab. LXXIXB, Fig. 9. D.

They are very irregular, and have many windings and turnings, which communicate with each other, and are lined, like the Cells of other Bones, with the *Periosteum Internum*.

They assist the *Tympanum* in reflecting Sound.

In *Quadrupeds* which hear acutely, there are large *Cavities*, connected with the *Tympanum*, which seem to supply the place of *Mastoid Cells*.

Above the *Promontory*, a *Hole*, called *Fenestra Ovalis*, the upper and under edges of which are convex upwards, —for lodging the Base of the *Stapes*. Tab. LXXVII. Fig. 11. *e*.

The inner edges of this Hole are contracted by a narrow Border, upon which the end of the *Stapes* rests.

Below the *Fenestra Ovalis*, and at the under and back part of the *Promontory*, a *Hole*, smaller than the former, called *Fenestra Rotunda*. Tab. LXXVII. Fig. 11. *d*.

It is placed obliquely backwards and outwards, leads to the *Cochlea*, but is shut up by a *Membrane* which assists in communicating Sound to the *Labyrinth*.

The *Sides* or *Walls* of the *Tympanum*, which likewise assist in conveying Sound to the *Labyrinth*, are lined with *Periosteum*, which is reflected into the different Passages leading from it.

The Cavity of the *Tympanum* contains Four small Bones, called *Ossicula Auditus*, which form a chain stretching across from the *Membrana Tympani* to the *Labyrinth*. Tab. XIV. Fig. 9.

The *Ossicula Auditus* are,—the *Malleus*, the *Incus*, the *Os Orbiculare*, and the *Stapes*,—these names being derived from Substances which they are supposed to resemble in shape.

The *Malleus*, or *Hammer*, consists of a round Head, a small Neck, a *Manubrium* or Handle, and two small Processes, one in the Neck, long and very slender, and therefore called *Gracilis*; the other in the upper end of the Handle, called *Processus Brevis*. Tab. XIII. Fig. 9. B. Tab. LXXIX. Fig. 4. 5. 6.

The *Handle* is by some Authors considered as one of the Processes, and is then called the longest of the three. It forms an Angle with the Neck, becoming gradually smaller, and is bent at its extremity towards the *Membrana Tympani*.

In the natural situation, the *Head* is turned upwards and inwards, and the *Handle* down upon the *Membrana Tympani*, to which it adheres. Tab. LXXVIII. Tab. LXXIX.

The *Incus*, compared in shape to an *Anvil*, but more resembling one of the *Dentes Molares*, with its roots widely separated, is situated behind the *Malleus*, and is formed of a *Body* and two *Crura* of unequal length. Tab. XIV. LXXVIII. LXXIX.

The *Body* has a *Cavity* and two *Eminences*, corresponding to that part of the *Malleus* with which it is articulated.

The *short Crus* extends backwards, and is joined by a Ligament to the edge of the *Mastoid Opening*.

The *long Crus* is turned downwards, with the point a little flattened, and bent inwards.

The *Os Orbiculare* is the smallest Bone of the Body, being considerably less than a grain of Mustard-seed. Tab. XIV. Fig. 9. D. Tab. LXXIX. Fig. 10. 11.

It is articulated with the point of the long Process of the *Incus*, and is so firmly fixed to it, that in separating the small Bones of the Ear from each other, it is apt to adhere to the *Incus*, and has on this account been frequently considered as a Process of that Bone.

The *Stapes* is named from a striking resemblance it has

has to a *Stirrup*. It is divided into *Head*, *Crura*, and *Base*. Tab. LXXIX. Fig. 12. 13.

The *Head* is placed upon a small flat Neck, and is articulated with the Os Orbiculare.

The *Crura*, like those of the Incus, are unequal in length, and have each a Groove on the inside, which gives insertion to a Membrane stretched between them.

The *Base* is of an oval shape, and has no Perforation in it;—its edges correspond with those of the Fenestra Ovalis, with which it is articulated. Tab. LXXIX. Fig. 27.—Tab. LXXIXB. Fig. 28.

The Stapes is placed horizontally, being nearly at a right Angle with the inferior Crus of the Incus. Its two Crura are placed in the same plane,—the longest backwards.

The small Bones of the Ear are articulated with each other by *Capsular Ligaments* proportioned to their size, and are covered by Periosteum, which likewise fixes them to the Membrana Tympani and Fenestra Ovalis.

The small Bones have the following *Muscles* fixed to them, which serve for their different motions.

TENSOR TYMPANI, vel Internus Auris.

Origin: From the Cartilaginous extremity of the Eustachian Tube, near the entry of the Artery of the Dura Mater. From thence, its Fleishy Belly runs backwards in a Canal peculiar to it, at the upper and inner part of the Osseous Portion of the Tube, being covered only by a thin Plate of Bone. It sends off a slender Tendon, which makes a turn in the Tympanum, and passes outwards.

Insertion: Into the posterior part of the Handle of the Malleus, a little below the root of its long Process. Tab. LXXVII. Fig. 10.—Tab. LXXVIII. Fig. 1.—Tab. LXXIXB. Fig. 19. e, f.

Action: To pull the Malleus and Membrana Tympani inwards, by which the Membrane is rendered more tense, and more concave towards the Meatus, and thereby better adapted for the impression of weak sounds.

LAXATOR TYMPANI.

Origin: By a very small beginning, from the extremity of the Spinous Process of the Sphenoid Bone, behind the entry of the Artery of the Dura Mater; after which it runs backwards and a little upwards, at the outside of the Eustachian Tube, in a Fissure of the Os Temporis, near the Fossa which lodges the Condyle of the Lower Jaw.

Insertion: Into the long Process of the Malleus within the Tympanum. Tab. LXXVII. Fig. 6. g. Fig. 9. b.—Tab. LXXIX. Fig. 19. c.

Action: To draw the Malleus obliquely forwards and outwards, and thereby to render the Membrana Tympani less convex, or to relax it when sounds are too strong.—HALLER denies the existence of Muscular Fi-

bres in this Substance.—SABATIER describes it, but doubts of its Muscularity.

STAPEDIUS.

Origin: By a minute Fleishy Belly, from a small Cavern in the Pars Petrofa, near the Cells of the Mastoid Process. Its Tendon passes forwards through a Perforation in that Cavern, and goes into the Tympanum.

Insertion: Into the posterior part of the Head of the Stapes. Tab. LXXVII. Fig. 10. c.—Tab. LXXIX. Fig. 21. b. Fig. 28. i.

Action: To draw the Head of the Stapes obliquely upwards and backwards, by which the posterior part of its Base is moved inwards, and the anterior part outwards, and the Membrana Tympani thereby put upon the stretch.

LABYRINTH.

The *Labyrinth*, so called from its Sinuosities and Windings, is situated at the inner part of the Tympanum, and is formed of the *Vestible*, *Cochlea*, and *Semicircular Canals*, together with the *Canalis FALLOPII* and *Meatus Auditorius Internus*. Tab. LXXIX. Fig. 19. 21. 22. 23.

The *Vestible*, named from its forming a Porch or Entry to the Cochlea and Semicircular Canals, is of an oval figure, nearly of the size and shape of a decorticated grain of barley, and is situated at the inner side of the Base of the Stapes. Tab. LXXIX. Fig. 23. d. Fig. 25. g.—Tab. LXXIX. Fig. 28.

There are three contiguous *Cavities* in the Vestible, one of which, the *Semi-oval*, is situated above; another, the *Hemispherical*, below; and the third, or *Sulciform*, which is the Orifice of the Aquæductus Vestibuli, is placed behind. Tab. LXXVIII. Fig. 10.

In the Vestible, there are several Holes which communicate with the neighbouring parts, viz.

The *Fenestra Ovalis*, situated at the outside, by which it communicates with the Tympanum. Tab. LXXVII. Fig. 11.—Tab. LXXIX. Fig. 1.

A round Hole, situated at the fore and under part, by which it communicates with one of the Canals of the Cochlea. Tab. LXXVIII. Fig. 5. g.—Tab. LXXIXA. Fig. 1.

Five Similar Foramina behind, by which it communicates with the Semicircular Canals. Tab. LXXVIII. Fig. 5.—Tab. LXXIX. Fig. 1.

Towards the Meatus Auditorius Internus, it has four or five *Cribriform Perforations*, for the transmission of Nerves. Tab. LXXVIII. Fig. 2. i.

The *Cochlea* is situated next the anterior extremity of the Os Petrosum, and at the fore-part of the Vestible, in such a manner as to have its Base towards the Meatus Auditorius Internus, and its Apex in the opposite direction,—or facing outwards. Tab. LXXIX. Fig. 25. k, l. Fig. 19. &c.

It has two *Canals* or *Gyri*, called *Scalae*, from a supposed resemblance to stair-cases; the *Gyri* or Turns of which are very close to each other, and run in a spiral direction, like the Shell of a Snail, from which the part has obtained its name. Tab. LXXIXA. Fig. 2.

The Cochlea forms *two Circumvolutions* or *Turns and a half*, the first of which is much larger and wider than the other Turn and a half, which become suddenly smaller. Tab. LXXIX. Fig. 25.—Tab. LXXIXA. Fig. 1. 2.

The two Canals are upon the same level, the inner one next the Base, and the outer next the point of the Cochlea. Tab. LXXIX. Fig. 25.

The *Gyri* go round a Nucleus, Axis, or central Pillar, which is nearly horizontal, and is formed of *two hollow Cones*, with their points turned to each other, the one termed *Modiolus*, from its resemblance to the Spindle of a winding Stair-case, the other *Infundibulum*, or Funnel.

The *Modiolus* forms the inner and larger portion of the central Pillar, and is that Cavity seen in the bottom or outer extremity of the Meatus Auditorius Internus. Tab. LXXIXA. Fig. 1.—3.

It lodges the Branch of the *Portio Mollis* of the Seventh Pair of Nerves which goes to the Cochlea, and is Cribiform, or full of small Holes for the passage of the Twigs of that Branch. Tab. LXXIXA. Fig. 2. 4.

The *Modiolus* consists of *two Plates*, with numerous *Cells* and *Passages* between them, and terminates in the middle of the second Gyrus of the Cochlea. Tab. LXXIXA. Fig. 2.

The *Infundibulum* is an imperfect Funnel, the Apex of which is common with that of the *Modiolus*, and the Base is covered by the Apex of the Cochlea, which is termed *Cupola*. Tab. LXXIXA. Fig. 2. 3.

Between the *Scalae* of the Cochlea there is a Partition, called *Lamina Spiralis*, or *Septum Scalae*; the larger portion of which, next the *Modiolus*, is formed of Bone; the remainder, or that part next the opposite side of the *Scalae*, is composed of a Cartilaginous Membrane, and termed by VALSALVA *Zona Cochleæ*.—This drops out by maceration, so as afterwards to leave only a partial Septum. Tab. LXXIXA. Fig. 2. 3.

The Osseous part of the *Lamina Spiralis* is composed of *two extremely thin Cribiform Plates*, which gradually approach each other at their opposite edges, where they are perforated by numerous Holes. Tab. LXXIXA. Fig. 2.

The Termination of the *Lamina Spiralis*, and of the *Scala Tympani*, forms a *Hamulus*, or small Hook, which projects into the *Infundibulum*. Tab. LXXIXA. Fig. 1. 2.

One of the Canals or *Scalae* of the Cochlea opens into the under and fore part of the Vestible, and is termed *Scala Vestibuli*; Tab. LXXVIII. Fig. 5. g.—Tab. LXXIXA. Fig. 1.—3.; this is not shut by any Membrane: The other, which is the smaller of the two, communicates with the Tympanum by the *Fenestra Ro-*

tunda, but is shut in the Subject by a *Membrana Tympani Secundarii*, and is called *Scala Tympani*.

The Partition between the two *Gyri* or Turns of the Cochlea, like the Osseous part of the *Lamina Spiralis*, is formed of *two Plates*, with a small *Cavity* between them. Tab. LXXIXA. Fig. 2.

The *Volute*, or Spiral of the Cochlea, begins below, runs forwards, and then round, so as to form, as has been already mentioned, two Circles or Turns and a half, the direction of the *Gyri* corresponding with those of the Shell of a Snail. Tab. LXXVIII. Fig. 5.

The Canals of the Cochlea are conical, becoming gradually smaller towards the Apex, where they communicate with each other, through the medium of the *Infundibulum*. Tab. LXXVIII.—Tab. LXXIXA. Fig. 1. 2. This communication is called by CASSEBOHM, who gives the fullest Treatise upon the Ear, *Canalis Sclerum Communis*.

The *Semicircular Canals* are three in number,—the *Superior* or *Verticle*,—the *Posterior* or *Oblique*,—and the *Exterior* or *Horizontal*. Tab. LXXIX. Fig. 19.—26.

The *Superior* is placed transversely, in the upper part of the Pars Petrosa, with its convex side upwards.

The *Posterior* is farther back than the former one, and is parallel to the length of the Pars Petrosa, with the convex side turned backwards.—One of its extremities is placed above, and the other below, the upper extremity joining with the internal one of the Vertical Canal, by which a common Canal is formed.

The *Exterior* is less than the other two, which are more of an equal size, is placed next the Tympanum, and has its extremities and curvatures nearly upon the same plane;—with the convex part of the curve placed backwards.

Each of the Canals forms upwards of three-fourths of a Circle, can admit the head of a small Pin, and has an Enlargement, *Ampulla*, or *Cavitas Elliptica*, at one end, the other extremity being nearly of the same size with the rest of the Canal. Tab. LXXIXB. Fig. 29.—Tab. LXXVIII. Fig. 10.

The *Orifices* are only five in number, two of the Canals having a common termination. Of these Orifices, three are situated at the inside, and two at the outside of the Vestible, into the posterior part of which they open, without being closed by any Membrane.

In the bottom of the Meatus Auditorius Internus, which is situated in the posterior Surface of the Pars Petrosa, there is a large under, and a small upper *Fossula*, separated by a sharp Ridge. Tab. LXXIXA. Fig. 1.

The fore-part of the inferior *Fossula* leads towards the Cochlea, and is perforated with numberless *minute Holes*, through which Branches of the *Portio Mollis* of the Seventh Pair of Nerves pass to the Cochlea. Tab. LXXIXA. Fig. 1.

One Hole in the centre, larger than the rest, transmits a Branch of that Nerve to the *Infundibulum*. Tab. LXXIXA. Fig. 1. This Hole, however, is frequently enlarged,

enlarged, in consequence of the Bone, which is extremely thin, being broken while preparing it.

In the back part of the inferior Fossula, three or four *Cribriform Holes* appear, for the transmission of Branches of that part of the Portio Mollis destined for the Vestible and Semicircular Canals. Tab. LXXIXA. Fig. 1.—Tab. LXXVIII. Fig. 12.—14.

In the upper Fossula of the Meatus Internus, there are *Two Passages*, one posterior and smaller, transmitting Nerves into the Elliptical Cavity of the Vestible.

The other, the anterior and largest, is termed *Canalis*, vel *Aqueductus FALLOPII*,—from a resemblance it bears to an Italian Aqueduct; and serves for the transmission of the Portio Dura of the Seventh Pair of Nerves. Tab. LXXIXA. Fig. 1.—Tab. LXXVIII. Fig. 2.

The *Canal* of *Fallopian* goes through the upper part of the Pars Petrofa, passes downwards and backwards between the Foramen Ovale and external Semicircular Canal, and terminates in the Foramen Stylo-Mastoideum.

In its passage through the Pars Petrofa, it communicates with the Foramen Innominatum, situated on the upper and fore part of the Petrous Process. Tab. V. n.

In Children, the Labyrinth is almost as large as in Adults, its Substance complete and hard, while the Bone which surrounds it is soft and spongy; on which account it is easily separated from the rest of the Pars Petrofa.

The different Cavities and Passages of the Labyrinth are lined with the Periosteum, which in the Vestible fills the Fenestra Ovalis, and of consequence covers the Base of the Stapes.

The Periosteum of the two Canals of the Cochlea lining the Membranous portion of the Lamina Spiralis, which, together with the Osseous part, completes the Septum between the two Scalæ.

The Periosteum of the Cochlea also assists that of the Tympanum, in forming the Membrane of the Fenestra Rotunda, which is sometimes called *Membrana Tympani Secundarii*, from a resemblance to the *Membrana Tympani*, and from being also, like it, a little concave on the outer, and convex on the inner Surface, or where it faces the Scala to which it belongs.

Besides the Periosteum, the Vestible, Cochlea, and Semicircular Canals, contain a *Pulpy Membrane*, upon which the Portio Mollis is irregularly dispersed.

In the Vestible, the Pulpy Membrane forms a *Sac*, in shape resembling that of the Osseous Cavity which contains it, and which is described and beautifully delineated by SCARPA. Tab. LXXVIII. Fig. 13. a.

When the Sac is laid open upon the upper and outer part, a *Partition* appears, partaking of the nature of the Sac, and termed by DR MECKEL *Septum Vestibuli Nervoso-Membranaceum*.

In the Cochlea, the Pulpy Membrane is in contact with the Periosteum, but can be separated from that Membrane without much difficulty.

In the Semicircular Canals, it is at some distance from the Periosteum of these Bones, and is considerably

smaller; but, like them, it forms distinct Tubes, which communicate with the Vestible. Like the Osseous, the Membranous Canals also form Ampullæ, or Elliptic Cavities at one end. Tab. LXXVIII. Fig. 13. b—g.

The *Arteries* of the Labyrinth arise by one or two small Branches, chiefly from the Vertebral Artery, and pass through the Cribriform Plate, at the bottom of the Meatus Internus which belongs to the Labyrinth. Tab. LXXIXB. Fig. 30.

From the Labyrinth one or two *Veins* return, and terminate in the end of the Lateral Sinus.

The Cavity of the Vestible contains no Air, but is constantly filled with a *Watery Fluid*, called *Aqua Labyrinthi*, supposed to be secreted from the Arteries of the Periosteum, and which is found to resemble the Aqueous Humour of the Eye.

The Aqueous Fluid fills the Vestible and Scalæ of the Cochlea, and likewise surrounds the Membranous Semicircular Canals.

The *Aqua Labyrinthi* is considered as a medium by which Sounds are communicated from the Membrane filling the round and oval Holes, and from the Base of the Stapes to the Pulpy Membrane placed in it.

The superfluous part of the Aqua Labyrinthi is supposed by COTUNNIUS to be carried off by two small *Conical Ducts*, more particularly described by him than by some preceding Anatomists, who were partly acquainted with them, but considered them as Blood-vessels.

One of the Aqueducts of COTUNNIUS, called *Aqueductus Cochleæ*, begins at the under part of the Scala Tympani, near the Fenestra Rotunda, and, after passing through the Pars Petrofa, is seen, in the Figures he gives of it, terminating by a wide Triangular Opening, upon the Surface of the Dura Mater, between the passages of the Seventh and Eighth Pair of Nerves. Tab. LXXVIII. Fig. 18.—Tab. LXXIXA. Fig. 7. q.

The other Duct, called *Aqueductus Vestibuli*, begins under the termination of the common Canal, in the Vestible, from which it descends, and terminates by a Triangular Opening between the Layers of the Dura Mater, behind the Meatus Internus, and half-way between the upper edge of the Pars Petrofa and Diverticulum of the Internal Jugular Vein. Tab. LXXVIII. Fig. 7. s.—Tab. LXXIXA. Fig. 7. v.

The *Nerves* of the Labyrinth are derived entirely from the Seventh Pair.

The *Auditory Nerve* is composed of two Branches, one of which is called *Portio Dura*, and is harder than the other, termed *Portio Mollis*.

The Trunk of the Auditory Nerve passes into the Meatus Internus, covered by the investing Membrane of the Brain.

The *Portio Dura* goes through the *Canalis FALLOPII*, Tab. LXXVIII. Fig. 14. x, sending off Branches through Perforations, in the sides of the Canal, to the Stapedius, and to the Mastoid Cells.

One *reflected Branch* passing through the Foramen Innominatum

nominatum in the Pars Petrofa, forms a connection between the Portio Dura and the second part of the Fifth Pair. Tab. LXXIXA. Fig. 7. *t.*

Another, called *Chorda Tympani*, passes across the Cavity of the Tympanum, between the inferior Crus of the Incus and Handle of the Malleus, and, after running along the outside of the Eustachian Tube, joins the Lingual Branch of the Fifth Pair. Tab. LXXIXA. Fig. 6. In its passage, it supplies the Muscles of the Malleus, and Membranes, &c. of the Tympanum.

The remainder of the Portio Dura is dispersed upon the Face.

The *Portio Mollis* is divided into two principal parts,—one to the Cochlea, the other to the Vestible and Semicircular Canals. Tab. LXXVIII. Fig. 11. 13. 14.

The Branches of the Cochlea pass through the Cribriform Plates of the Modiolus, to the Pulpy Membrane lying in the Scala.

The Branches run between, and likewise on the outside of the Partitions which divide the Cochlea into Gyri, and the Gyri into Scalae, and are large and numerous in proportion to the part they supply.

The largest and most numerous of these Branches are dispersed upon the Lamina Spiralis, where they form an intricate Plexus, the Threads of which are at first opaque, but are afterwards of the colour of the Retina of

the Eye. Tab. LXXVIII. Fig. 11. 13. 14.—Tab. LXXIXA. Fig. 4.

The Branches terminate, and appear also to meet upon that part of the Pulpy Membrane which is most distant from the Modiolus.

Through the Cribriform Plate, common to the Modiolus and Infundibulum, the last Branches of this Portion of the Nerves pass, to be spread out upon the Membrane lying within the Infundibulum.—*For a particular description of that part of the Portio Mollis distributed to the Cochlea, and of the Cochlea itself, see DR MONRO'S Treatise on the Ear.*

Of that part of the Portio Mollis destined for the Vestible and Semicircular Canals, one Branch goes through the posterior Hole in the upper part of the Meatus Internus; the rest pass through the Holes in the under and back part of the Meatus, already pointed out in the description of that Passage.

Having perforated the Foramina, the Nerves are seen first in distinct Plexus, after which they become transparent, and are lost upon the Sac contained in the Vestible, and upon the Ampullæ of the Membranous Semicircular Canals. Tab. LXXVIII. Fig. 11. 13.

The *Portio Mollis* is the Primary Part of the Organ of Hearing, to which all the other parts are subservient, and may be regarded as being of the same service to the Ear, as the *Retina* is to the Eye.

T A B L E LXXVII.

Various VIEWS of the ORGAN of HEARING, all from the Left Side.

FIG. 1.

The Anterior Part of the OUTER EAR.

- a, a, a,* The helix.
- b, b,* The antihelix.
- c,* The tragus.
- d,* The antitragus.
- e,* The lobe of the ear.
- f, f,* The cavitas innominata.
- g,* The scapha.
- h, h,* The concha, divided into two cavities by an intermediate projection.

FIG. 2.

The Common MUSCLES of the External EAR.

- a,* The helix pressed a little forwards, that the posterior muscles may be more distinctly seen.
- b, b,* The posterior part of the concha.
- c,* The attollens aurem.
- d,* The anterior auris.
- e, e, e,* The retrahentes aurem.

FIG. 3.

The MUSCLES proper to the Anterior Part of the CARTILAGE of the EAR.

- a,* The helicis major.
- b,* ——— minor.
- c,* The tragicus.
- d,* The antitragicus.

FIG. 4.

The MUSCLE proper to the Posterior Part of the CARTILAGE of the EAR.

- a,* The transversus auris, situated on the parts opposite the antihelix and scapha.
- b,* The part belonging to the scapha, composed of shorter fibres.

FIG. 5.

The EAR, with the MEATUS AUDITORIUS and its GLANDS, separated from the BONES, and viewed Posteriorly.

- a,* The pinna, or upper part of the ear.

- b,* The lobe of the ear.

c, d, The meatus auditorius externus.—*d,* Part of the mastoid sinuosity to which the posterior part of the incus was connected.

e, The glandulæ ceruminosæ, placed in a reticular substance.

f, The inner end of the meatus, without glands.

g, The membrana tympani.

FIG. 6.

The TEMPORAL BONE,—the Squamous Part of which is cut off, and only as much of the Bony Part taken away, as was necessary to shew the MEMBRANA TYMPANI bare.

a, The mastoid process.

b, The styloid process.

c, The bony part of the meatus externus, half of which is cut off.

d, The membrana tympani in situ, viewed externally.

e, The long branch of the incus, which appears across this membrane, but is at a little distance from it.

f, The handle of the malleus, which is joined to the back part of the membrana tympani.

g, The laxator tympani in situ.

FIG. 7.

Represents the same BONE as Fig. 6. and cut in the same manner, only the MEMBRANA TYMPANI is taken off, to shew the OSSICULA in situ, and bottom of the TYMPANUM.

a, The malleus.

b, The incus.

c, The stapes seen in front; its head covered by the beak of the long branch of the incus, and its base stopping up the fenestra ovalis.

d, The fenestra rotunda.

e, The bottom of the tympanum, which is the surface of the os petrosum.

f, g, The semi-canal which incloses the internal muscle of the malleus,—the anterior part being seen without, and the posterior part within the tympanum.

h, The bony part of the iter a palato ad aurem, or Eustachian tube, half of it being cut off to shew its cavity.

FIG.

Fig. 1.



Fig. 2.

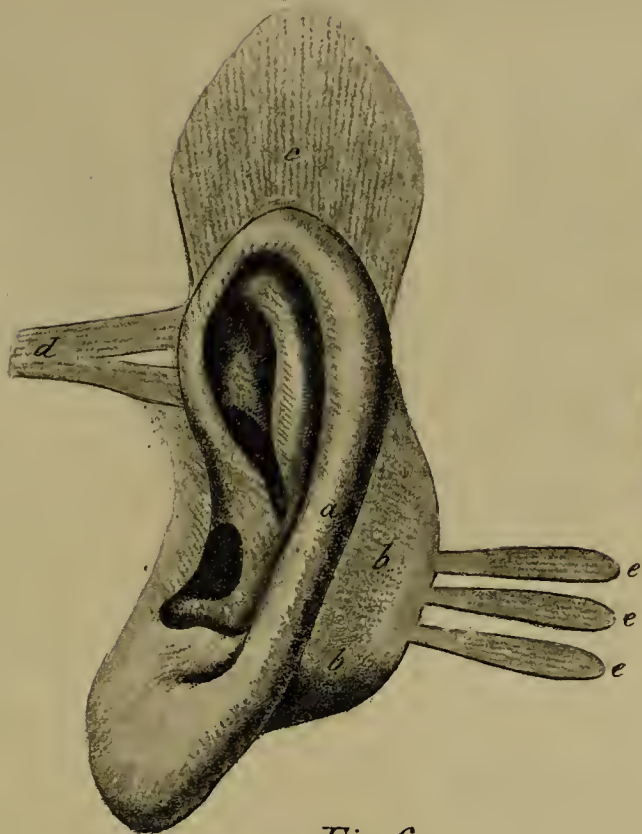
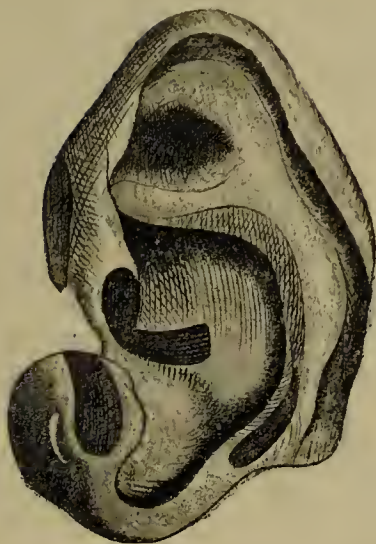


Fig. 3.



TAB. 77.
Fig.

4.



Fig. 5.



Fig. 6.

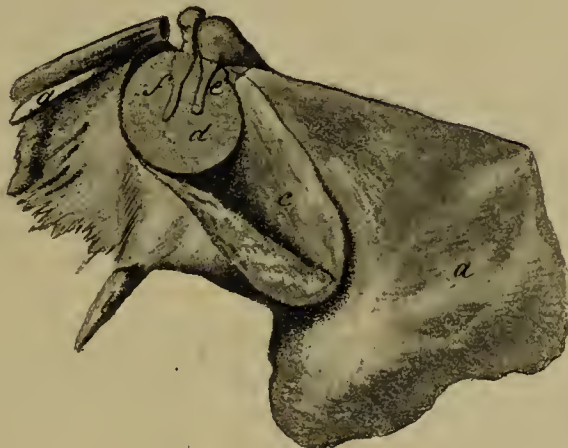


Fig. 7.

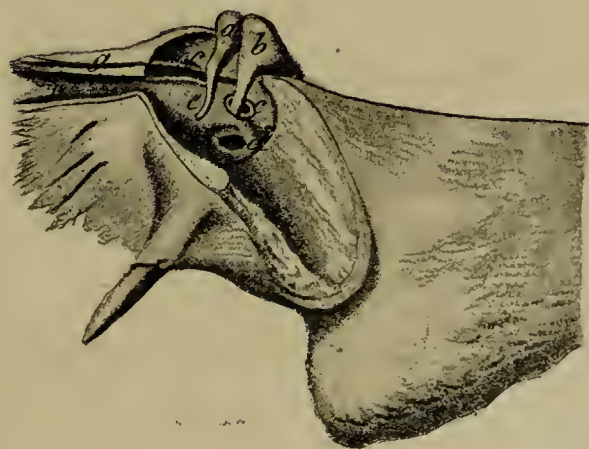


Fig. 8.



Fig. 12.



Fig. 11.

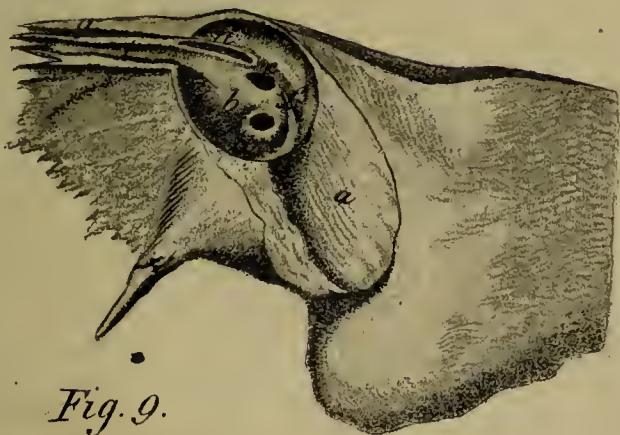


Fig. 9.

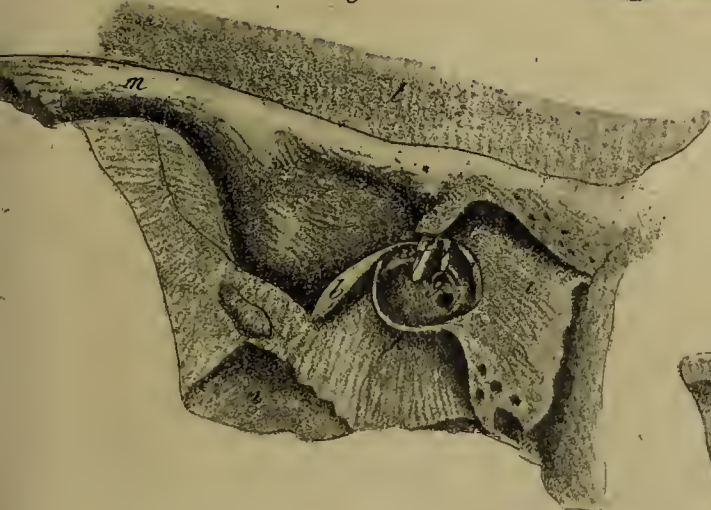


Fig. 10.

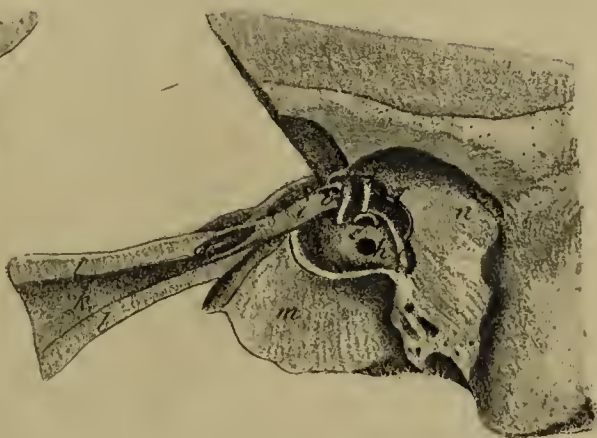


FIG. 8.

Represents the Back or Inner Part of the TEMPORAL BONE, as much of it being cut off as was necessary to obtain a View of the MEMBRANA TYMPANI, upon which the Back Part of the MALLEUS and INCUS is shewn, with the small Branch of the NERVE called CHORDA TYMPANI, and the CAVITY upon which the HEAD of the MALLEUS and the BODY of the INCUS rest, all in situ.

- a, The inner part of the squamous process.
- b, The mastoid process.
- c, c, A section of the pars petrosa.
- d, The malleus.
- e, The incus, with its short branch resting upon the entrance of the passage into the cells of the mastoid process.
- f, The chorda tympani passing between the long processes of the malleus and incus.
- g, The inside of the membrana tympani.

FIG. 9.

Represents the MUSCLES of the Internal EAR, with the OSSICULA and TEMPORAL BONE in their natural situation; also Part of the OS SPHENOIDES.

- a, The *luxator tympani* of ALBINUS, arising from the upper part of the edge of the tympanum.—It is inserted into the handle of the malleus, near the root of its shorter process.—By some authors it is considered merely as a ligament.
- b, The *laxator tympani*.
- c, The tendon of the tensor tympani coming out of the small opening of the bony channel in which it is contained.
- d, The stapedius.
- e, The handle of the malleus.
- f, The long process of the incus.
- g, The stapes.
- h, The foramen rotundum.
- i, Part of the auditory passage left entire, which lies in the squamous and mastoid processes.
- k, The under edge of the tympanum.
- l, The squamous process.
- m, The zygomatic process.
- n, The pars petrosa.
- o, Part of the os sphenoides.

FIG. 10.

The TENSOR TYMPANI and STAPEDIUS, with the Small BONES and the TEMPORAL BONE in their natural situation; also Part of the Soft Portion of the EUSTACHIAN TUBE.

- a, The tensor tympani.
- b, The tendon of that muscle coming out of the bony

canal in which it is lodged, to be fixed to the long process of the malleus.

- c, The muscle of the stapes.
- d, The incus.
- e, The stapes.
- f, The malleus.
- g, The aqueduct of Fallopius.
- h, The foramen rotundum.
- i, The osseous canal placed above the Eustachian tube, for containing the tensor tympani.
- k, The cartilaginous part of the Eustachian tube.
- l, l, The places from which the membranous part was cut off.
- m, The pars petrosa.
- n, Part of the meatus externus.

FIG. 11.

Represents the TEMPORAL BONE, the SQUAMOUS PROCESS and Part of the BONY PASSAGE being removed, and, in general, all the Parts of the TYMPANUM which might obstruct the view of the PARS PETROSA, which forms the bottom of the TYMPANUM.

- a, Part of the meatus externus.
- b, The promontory on the surface of the pars petrosa, which covers the scala tympani of the cochlea.
- c, The fenestra ovalis.
- d, ———— rotunda.
- e, The osseous canal which incloses the muscle of the stapes, from which the tendon is shewn extruded, to be inserted into the head of the stapes.
- f, The circumference which was occupied by the membrana tympani.
- g, h, The semi-canal which incloses the tensor tympani.
- i, Half of the bony passage of the Eustachian tube.

FIG. 12.

The TEMPORAL BONE, prepared in such a Manner as to shew the COCHLEA and SEMICIRCULAR CANALS in situ, and part of them cut open. They are somewhat magnified.

- a, The vault of the vestibule.
- b, The fenestra ovalis.
- c, The fenestra rotunda open.
- d, The lamina spiralis divested of the spiral canal which covers it, and of the membrane which connects it to the surface of the canal.
- e, f, g, The three semicircular canals in situ.
- h, i, k, The tympanum.
- l, l, The styloid, and,
- m, The mastoid process.

T A B L E LXXVIII.

Various VIEWS of the INTERNAL ORGAN of HEARING.

FIG. 1.

Represents the EAR viewed Anteriorly, or where it looks towards the FACE; but inclined a little to the OCCIPUT, to obtain a more distinct View of the Four Small BONES of the TYMPANUM.

- a*, The meatus auditorius externus.
- b*, That osseous portion from the wall of the mastoid finuosity, to which the shorter process of the incus is fixed.
- c*, The osseous part of the Eustachian tube.
- d*, The anterior side of the cartilage of the Eustachian tube, from which the fleshy fibres of the tensor tympani take their origin.
- e*, The extremity of the Fallopian aqueduct, through which the portio dura of the seventh pair of nerves passes.
- f*, The malleus.
- g*, The incus.
- h*, The stapes, between which and the incus the os orbiculare is seen.
- i*, The muscle of the stapes, freed from its osseous canal.
- k*, The tendon of the tensor tympani, also freed from its osseous canal.
- l*, The posterior semicircular canal.
- m*, The superior semicircular canal.
- n*, The exterior semicircular canal.
- o*, The vestibule, in the arch of which, according to this part of the view, only two of these holes are seen which transmit nervous twigs into its cavity.—The three remaining holes are seen in the following figure.
- p*, The canal of the cochlea.
- q*, The fleshy part of the circumflex muscle of the palate.
- r*, The tendinous part of that muscle.
- s*, The fleshy belly of the internal muscle of the malleus.
- t*, The external muscle of the malleus.
- v*, The chorda tympani.
- w*, The portio mollis of the auditory nerve, one part of which goes to the cochlea, and the other, which is divided into five twigs, to the vestibule;—two of these twigs are cut off, to obtain a view of the two holes in the arch of the vestibule, through which they entered.

FIG. 2.

Represents the EAR, seen on the Posterior Part, or where it looks to the OCCIPUT, but turned forwards to a certain length, to obtain a View of the FENESTRA ROTUNDA, MEMBRANA TYMPANI, and also Part of the Four Small BONES.

- a*, The Fallopian aqueduct.
- b*, The origin of the Eustachian tube.
- c*, The posterior side of the cartilage of this tube.
- d*, The termination, or mouth of the tube.
- e*, The circumflex muscle of the palate.
- f*, The posterior semicircular canal.
- g*, The superior semicircular canal.
- h*, The exterior semicircular canal.
- i*, The vestibule, in the arch of which, from this part of the view, three of the five small holes are seen, which transmit nervous twigs into the vestibule.—Under these is the fenestra rotunda.
- k*, The base of the cochlea, perforated with numerous small holes for the transmission of its nerves.

FIG. 3.

Represents the SACCULUS VESTIBULI, also the ZONE or LAMINA SPIRALIS of the COCHLEA, and the Membranaceous Semicircular CANALS, joined to the PORTIO MOLLIS of the AUDITORY NERVE;—of the natural size.

FIG. 4.

The LABYRINTH inverted, so as to be viewed on that Part which looks to the CAVITY of the TYMPANUM, whereby the FENESTRA OVALIS and ROTUNDA are seen. The parts are magnified.

- a*, The posterior semicircular canal.
- b*, The superior semicircular canal.
- c*, The exterior semicircular canal.
- d*, The fenestra rotunda.
- e*, ————— ovalis.
- f*, The cochlea.

FIG.

Fig. 1.



Fig. 2.

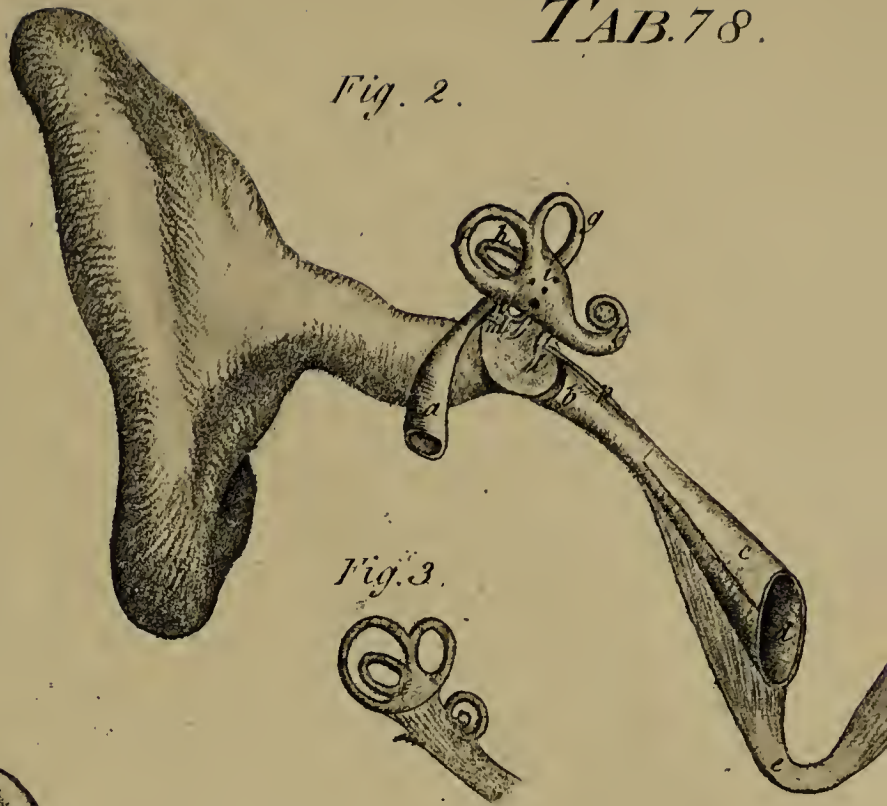


Fig. 3.



Fig. 4.



Fig. 10.



Fig. 11.

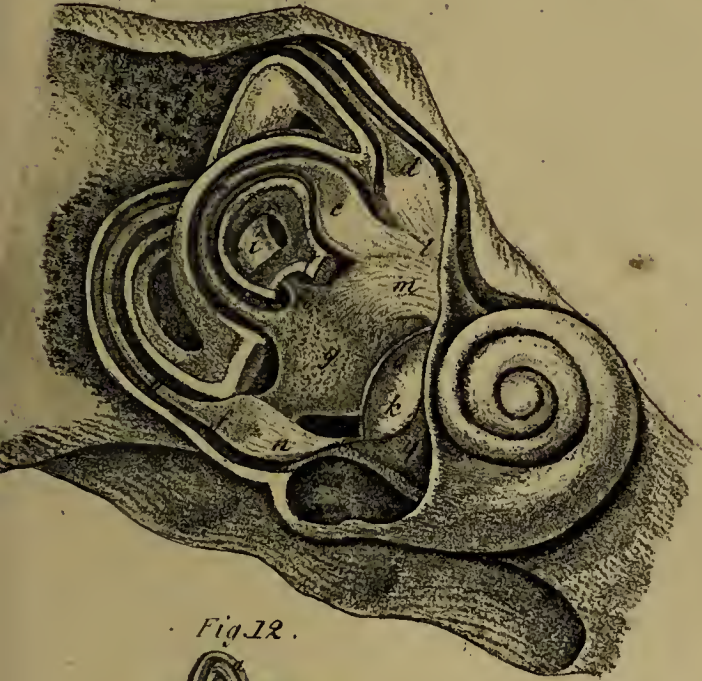


Fig. 5.



Fig. 6.

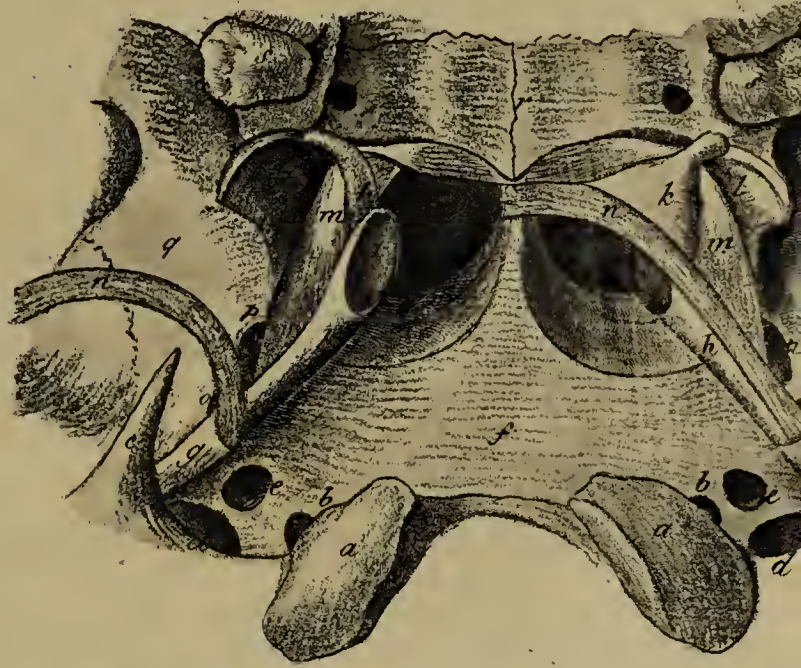


Fig. 7.



Fig. 8.

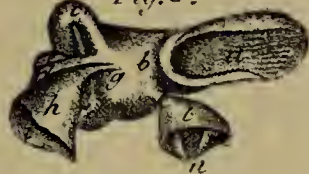


Fig. 9.



Fig. 12.



Fig. 13.

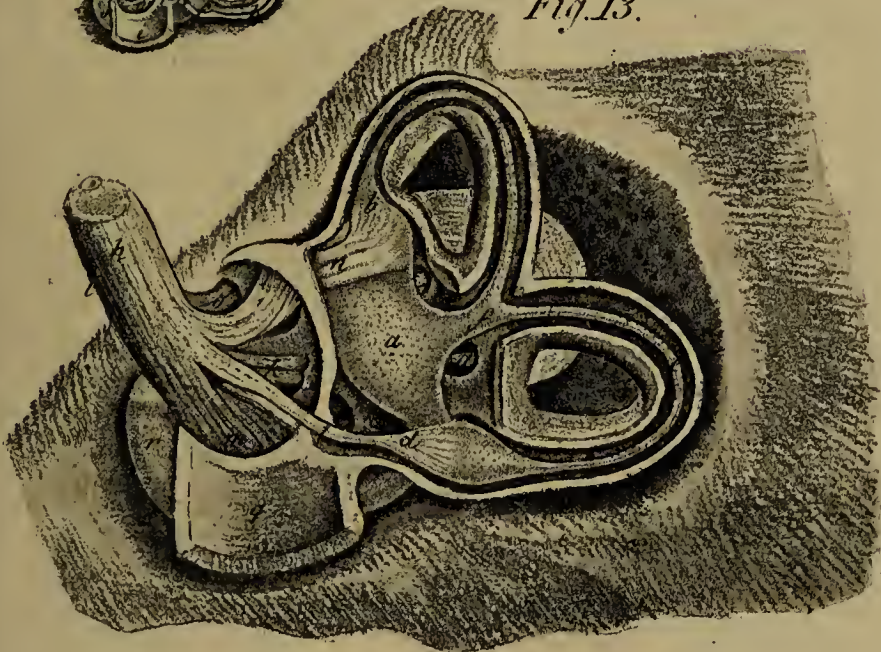


Fig. 14.

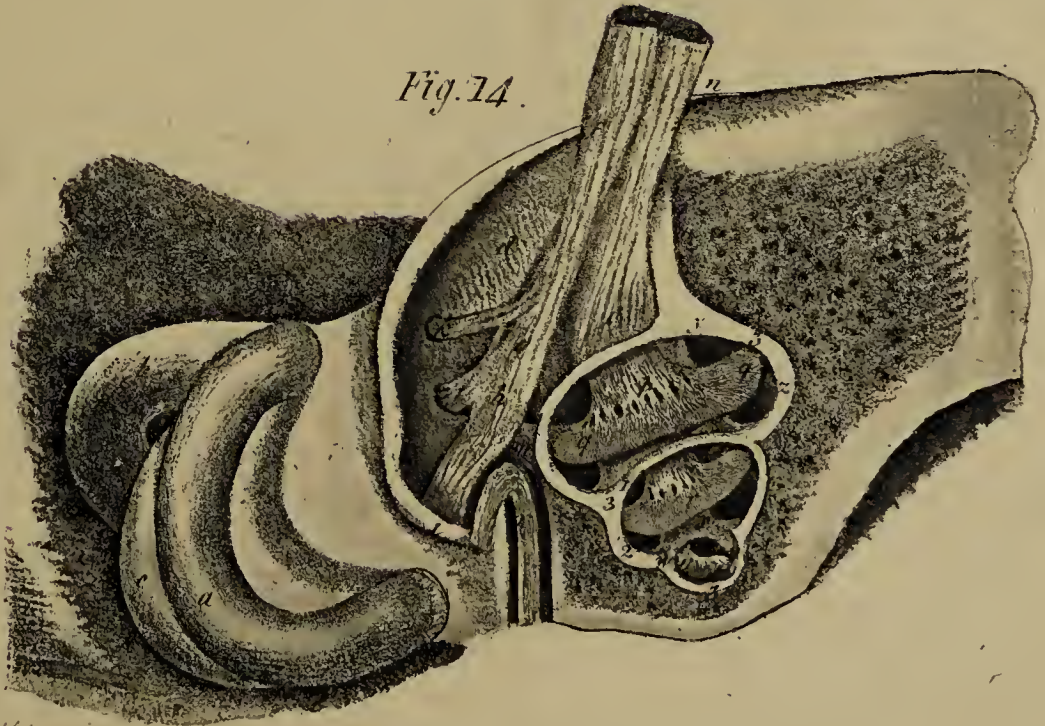


FIG. 5.

Shews the LABYRINTH seen on the side next the BRAIN, the Upper Part of the VESTIBLE removed, to obtain a View of its CAVITY, and in it the Orifices of the FENESTRA OVALIS, and the SCALA VESTIBULI in situ.

- a*, The posterior canal.
- b*, The superior canal.
- c*, The common canal.
- d*, The exterior canal.
- e, e, e*, The cavity of the vestibule.
- f*, The fenestra ovalis.
- g*, The orifice of the scala vestibuli.

FIG. 6.

Part of the BASE of the CRANIUM, with the EUSTACHIAN TUBES opening into the Back Part of the NOSE.

- a, a*, The condyles of the occipital bone.
- b, b*, Holes for the transmission of the ninth pair of nerves.
- c*, The styloid process of the right side.
- d, d*, The holes for the transmission of the internal jugular veins.
- e, e*, The holes for the entrance of the internal carotid arteries.
- f*, The interior membrane of the nostrils, extending from thence to the pharynx;—left in situ.
- g, b, g, b*, The Eustachian tubes;—*g, g*, Their osseous portions.
- i, i*, Their mouths, or large extremities opening into the back part of the nose.
- k, k*, The internal plates of the pterygoid processes of the sphenoid bone, over the inferior part of which the circumflex muscles of the palate transmit their tendons.
- l, l*, The external plates of the pterygoid processes.
- m, m*, The circumflex muscles of the palate, the tendons of which run over the inferior part of the plates *k, k*, to be inserted into the velum palati and semilunar edge of the ossa palati.
- n, n*, The levatores palati muscles, the left of which remains in situ; but the right is separated from its fellow, and removed out of its place, that the progress and termination of the tube, and the insertion of the circumflexus palati muscle may be distinctly seen.
- o, o*, The foramina spinalia, for the entrance of the arteries of the dura mater.
- p, p*, The foramina ovalia, through which the third branches of the fifth pair of nerves pass out.
- q*, The temporal plate of the sphenoid bone.
- r*, The ossa palati.
- s, s*, The dentes sapientiae.
- t, t*, The internal or posterior foramina of the nose.

FIG. 7.

Shews the OS TEMPORIS of a Fœtus of nine months, entire; viewed from that part which looks to the CAVITY of the SKULL.

- a*, The concave squamous portion.
- b*, The extremity of the zygomatic process.
- c*, The pars petrosa.
- d*, The meatus of the common canal of the nerves, called *Meatus Auditorius Internus*.
- e, e*, The upper portion of the superior semicircular canal, which, in the fœtus, is obviously elevated above the os petrosum.
- f*, The superior portion of the posterior semicircular canal, which, in the fœtus, is in like manner frequently elevated.
- g*, The osseous tube of the aqueduct of the vestibule.
- h*, A cavity imprinted in the bone, receiving the extremity of the osseous tube of the aqueduct.
- i*, A bristle introduced into the foramen of the aqueduct.
- k*, ————— vena vestibuli.
- l*, The entrance, or arched margin of the inferior orifice of the aqueduct of the cochlea.
- m*, A bristle introduced into this aqueduct.
- n*, The foramen innominatum which leads to the Vidian canal, through which a reflected branch passes from the second part of the fifth, to the portio dura of the seventh pair of nerves.
- o*, A part where small blood-vessels penetrate the substance of the bone.
- p*, A cavern found in the fœtus, under the superior semicircular canal, which, in the adult, is contracted into a foramen.
- q*, The anterior wing of the upper side of the os petrosum covering the colum of the cavity of the tympanum.
- r, r*, The joining of this plate with the pars squamosa.

FIG. 8.

Shews the Left LABYRINTH entire, with the Common CANAL of the NERVES, and the AQUEDUCTS, seen on the Part which looks to the OCCIPUT, and laid open by the removal of the surrounding BONE.

- a*, The orifice of the meatus internus, or common canal of the nerves.
- b*, The tuber, under which part of the vestibule and cochlea are hid.
- c*, The superior semicircular canal.
- d*, The posterior semicircular canal.
- e*, Part of the exterior canal, seen in this attitude of the bone.
- f*, The common canal formed by the union of the superior and posterior canals.
- g*, The first part of the aqueduct of the vestibule, the size of the cavity of which does not exceed that of a small bristle.
- h*, Part of the same aqueduct, gradually increasing into a horn, and compressed in some places.
- i*, The broad extremity of the osseous cornu of the aqueduct.

k, The

- k*, The arched entrance of the aqueduct of the cochlea.
l, The narrow part of the same aqueduct, near the fenestra rotunda.
m, The inferior orifice of the aqueduct of the cochlea.
n, The semi-canal descending through the anterior and inferior part of the above orifice.
o, A small foramen through which the vena cochleæ passes.

FIG. 9.

The same LABYRINTH with that shown in the preceding Figure, but here viewed from the Anterior Part, where it is turned towards the TEMPLE.

- a*, The anterior part of the common canal of the nerves.
b, Part of the superior semicircular canal.
c, The posterior semicircular canal.
d, The exterior semicircular canal.
e, The vestibule.
f, The orifice of the common canal.
g, The orifice of the aquæductus vestibuli.
h, The broad extremity of the same duct, corresponding to Fig. 8. *b*, *i*.
i, The cochlea.
k, Part of the first circle of the cochlea opened from the vestibule, to obtain a view of the lamina spiralis and scalæ.
l, The lamina spiralis, with the scalæ on each side of it.
m, The orifice of the aqueduct of the cochlea.
n, The broad extremity of this duct, answering with Fig. 8. *k*, *l*.

FIG. 10.

The Right LABYRINTH, viewed from the Outer Side, the VESTIBLE and SEMICIRCULAR CANALS being cut open.

- a*, The superior semicircular canal.
b, The posterior, and,
c, The exterior.
d, The elliptical cavity of the superior canal.
e, ————— exterior canal.
f, The orbicular cavity of posterior canal.
g, The common opening of the superior and posterior canals.
h, The other orifice of the exterior canal.
i, The ossæous pyramid of the vestibule.
k, The semi-oval cavity of the vestibule.
l, The hemispherical cavity of the vestibule.
m, The fulciform cavity of the vestibule, or the orifice of the aquæductus vestibuli.
n, The cochlea.
o, The sinus of the fenestra rotunda.
p, The scala tympani.
q, ————— vestibuli.
r, The macula cribrosa or foraminulenta.

FIG. 11.

A View of the LABYRINTH as in the former Figure, magnified; with the addition of the Contents of the VESTIBLE and SEMICIRCULAR CANALS.

- a*, The membranaceous tube of the superior semicircular canal.
b, ————— posterior canal.
c, ————— exterior canal.
d, The ampulla of the membranaceous tube of the superior canal.
e, f, The ampullæ of the other two membranaceous tubes.
g, The sacculus vestibuli, or alveus communis of the membranaceous tubes.
h, The membranaceous tube, entering,
i, The canal common to the superior and posterior canals.
k, The sacculus vestibuli opened.
l, Branches of the portio mollis of the seventh pair of nerves, to the ampullæ of the superior and exterior canals.
m, A nervous expansion on the sacculus vestibuli.
n, A nervous expansion on the ampulla of the posterior canal.
o, A pulpy expansion of the nerve in the bottom of the spherical sac.
p, The sinus of the fenestra rotunda, at the beginning of the scala tympani.
q, The scala vestibuli, separated from the scala tympani by the lamina spiralis.

FIG. 12.

The Right LABYRINTH cut open, and viewed from the CAVITY of the CRANIUM.

- a*, The canalis superior.
b, ————— posterior.
c, ————— exterior.
d, The elliptical cavity of the superior canal.
e, That of the exterior canal.
f, The orbicular cavity of the posterior canal.
g, The common canal; and before *g*, the other orifice of the exterior canal.
h, The fenestra ovalis.
i, The common canal of the nerves, or meatus auditorius internus.
k, The foramina in the small fossula at the bottom of the meatus internus, for the passage of branches of the portio mollis.
l, The macula cribrosa vestibuli.
m, The foramina behind the hemispherical cavity of the vestibule, for the passage of branches of the portio mollis.
n, A canal for the nerve which goes to the ampulla of the posterior canal.
o, The cribriform spiral plate, through which branches of the portio mollis pass into the cochlea.
p, The centre of the modiolus.
q, The beginning of the lamina spiralis of the cochlea.
r, The beginning of the aqueduct of Fallopius.
s, The cochlea.

FIG.

FIG. 13.

The same Section of the LABYRINTH with that represented in the former Figure, with the addition of the ALVEUS COMMUNIS, the MEMBRANACEOUS TUBES, and the AUDITORY NERVE.—The Parts much magnified.

- a*, The alveus communis, or sacculus vestibuli.
- b*, The ampulla of the membranaceous tube of the superior canal.
- c*, The membranaceous tube of that canal.
- d*, The ampulla of the membranaceous tube of the posterior canal.
- e*, The membranaceous tube of that canal.
- f*, ————— the common canal.
- g*, ————— exterior canal.
- h, i*, The trunk of the seventh pair, or auditory nerve.
- k*, Filaments of the portio mollis of the seventh pair, to the spherical sac of the vestibule.
- l*, The smaller branch of the portio mollis, to the ampulla of the posterior membranaceous tube.
- m*, Filaments to the cochlea.
- n*, The larger branch of the portio mollis, to the ampullæ of the superior and exterior membranaceous tubes.
- o*, The portio dura of the seventh pair.
- p*, The beginning of the lamina spiralis of the cochlea.
- q*, The meatus auditorius internus, or common canal of the nerves.
- r*, The cochlea.

FIG. 14.

A View of the LABYRINTH and SEVENTH PAIR of NERVES of the Right Side. The COCHLEA is cut on its Upper Part; the SEMICIRCULAR CANALS are left entire. The whole, as in the former Figure, is much magnified.

- a*, The superior semicircular canal.
- b*, The posterior canal.
- c*, The exterior canal.

- d*, The meatus internus, or common canal of the nerves.
- e*, The portio mollis of the seventh pair of nerves.
- f*, The anterior fasciculus of the portio mollis.
- g*, A plexus formed by that fasciculus.
- h*, A gangliform enlargement of that fasciculus.
- i*, The larger branch of that fasciculus.
- k*, The smaller branch.
- l*, Filaments behind the bottom of the hemispherical cavity of the vestibule.
- m*, Filaments which pass through the beginning of the lamina spiralis of the cochlea.
- n*, The posterior fasciculus of the portio mollis.
- o*, Filaments passing through the cribriform plate, which forms the modiolus of the cochlea.
- p*, Nervous stamina, still included in the small osseous canals of the modiolus.—Below *p* are seen, the principal branches of this part of the portio mollis, at the root of the lamina spiralis, and farther on, their reticulated appearance.
- q, q*, The continuation of these nerves upon the soft part of the lamina spiralis, in the first turn of the cochlea.
- r*, Similar parts to the above, in the second turn of the cochlea.
- s*, The infundibulum.
- t, u*, The last half-turn of the lamina spiralis mollis, with the continuation of the branches of the portio mollis dispersed upon it.
- v*, The termination of the scala tympani in the infundibulum.
- w*, ————— vestibuli in the infundibulum.
- x*, The portio dura of the seventh pair of nerves, part of which is reflected.
- y*, The scala tympani in the first turn of the cochlea.
- z*, ————— vestibuli in the first turn of the cochlea.
- 1. 2. The same parts seen in the second turn of the cochlea.
- 3. 3. 3. The cut edge of the scalæ of the cochlea;—the undermost 3. points out its cupola.

T A B L E LXXIX.

Additional VIEWS of the EAR ;—all from the Right Side.

FIG. 1.

The TEMPORAL BONE, with the MEMBRANA TYMPANI, and the MEMBRANA MUCOSA, which covers it in a Fœtus.

- a*, The membrana tympani.
- b*, The manubrium of the malleus, adhering to the membrana tympani, and shining through it.
- c*, The membrana mucosa, separated from the membrana tympani, and turned upwards.
- d*, The ring of bone in which the membrana tympani is incased.

FIG. 2.

The ARTERIES of the Inner SURFACE of the MEMBRANA TYMPANI of a Fœtus, viewed with a Magnifying Glass.

- a*, A portion of the pars squamosa of the temporal bone, which is cut.
- b*, The annulus of the membrana tympani.
- c*, The fissura GLASERI.
- d*, The malleus.
- e*, The incus.

Two small arterious trunks are observed, one emerging under the long process of the malleus; arises from the ramus tympanicus of the temporal artery: The other, which runs between the manubrium of the malleus and the long crus of the incus, springs from the arteria stylo-mastoidea. They join together by various anastomoses.

FIG. 3.

The ARTERIES of the PERIOSTEUM of the TYMPANUM.

The periosteum is separated from the cavity of the tympanum, the arteries of which appear very conspicuous.

FIG. 4.

The MALLEUS of an ADULT, of the Natural Size.

FIG. 5.

The same BONE Magnified.

- a*, The caput mallei, with a pit in the middle of it, surrounded by two eminent lines.
- b*, The cervix.
- c*, The processus brevis.
- d*, The processus longus, in this specimen, as often happens in the adult, terminating in the form of a spatula.
- e*, The manubrium, with its apex turned outwards and forwards.

FIG. 6.

The MALLEUS of a New-born CHILD, cut across and magnified

FIG. 7.

The INCUS of an ADULT, of the natural Size.

FIG. 8.

The same BONE magnified.

- a*, *a*, The body.
- b*, The foveola which receives the head of the malleus.
- c*, The long crus which joins the os subrotundum.
- d*, The short crus.

FIG. 9.

The INCUS of a Fœtus of the fifth month, cut and magnified.

- a*, A cavity in the body of the incus.
- b*, The cavity which receives the head of the malleus.

FIG. 10.

The OSSICULUM SUBROTUNDUM of an ADULT.

FIG. 11.

The same BONE magnified: The Surface which corresponds to the long Crus of the Incus, is a little concave; that which answers to the Apex of the Staples is somewhat convex.

FIG.

Fig. 1.



Fig. 2.



Fig. 3.

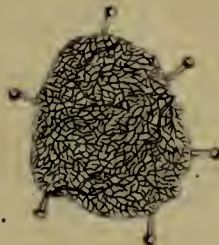


Fig. 5.



Fig. 6.



Fig. 4.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.

Fig. 11.

Fig. 12.



Fig. 14.



Fig. 13.



Fig. 15.

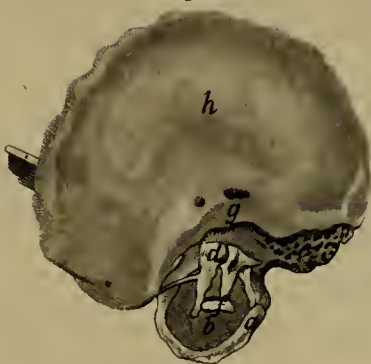


Fig. 16.

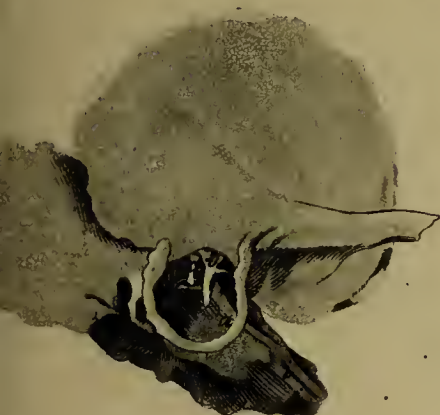


Fig. 17.

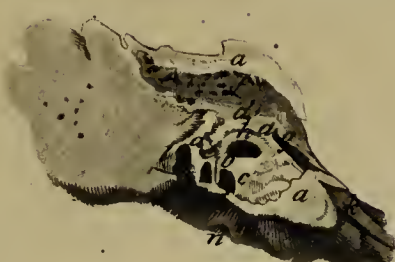


Fig. 18.

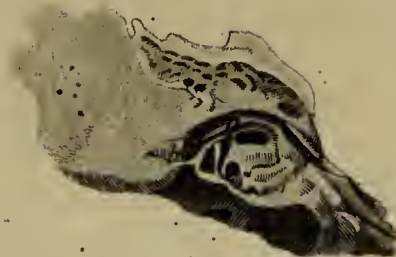


Fig. 19.

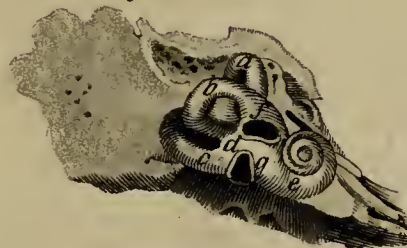


Fig. 20.



Fig. 21.



Fig. 22.

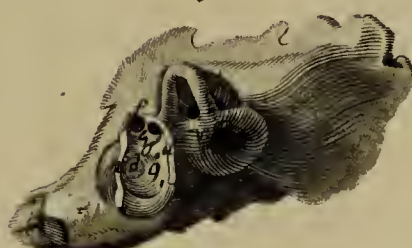


Fig. 23.



Fig. 24.



Fig. 25.

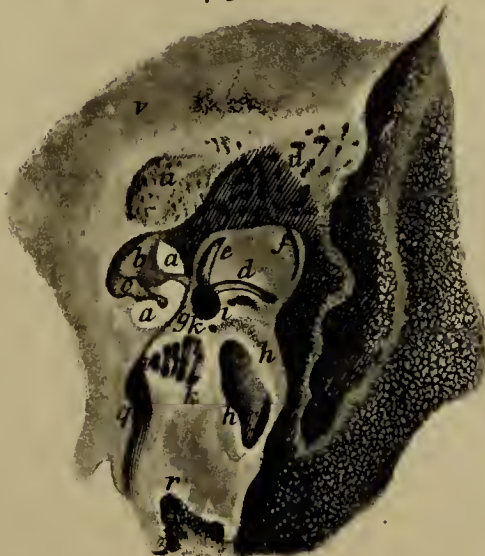


Fig. 27.



Fig. 26.



FIG. 12.

The STAPES of an ADULT of the Natural Size.

FIG. 13.

The same BONE magnified.

- a*, The basis.
- b, c*, The crura.
- d*, The apex which joins the ossiculum subrotundum.
- e*, The membrane which occupies the space between the crura.

FIG. 14.

The BASIS of the STAPES magnified, seen from the Inner Side, or that corresponding with the FENESTRA OVALIS.

FIG. 15.

The OS TEMPORIS of a CHILD, with the MEMBRANA TYMPANI and OSSICULA AUDITUS separated from the PARS PETROSA, and viewed from the Anterior and Inner Side.

- a*, The annulus membranæ tympani.
- b*, The membrana tympani adhering to a groove of the annulus.
- c*, Part of the tympanum formed by the pars squamosa.
- d*, The malleus; its long process is placed in a groove of the annulus.
- e*, The incus.
- f*, The basis of the stapes, the other parts of the bone not being seen in this view.
- g*, The part where the pars squamosa joined the petrosa.
- h*, The pars squamosa.
- i*, The zygomatic process.

FIG. 16.

The TEMPORAL BONE of a CHILD, viewed obliquely from the under and outer part; the MEMBRANA TYMPANI being removed.

- a*, The tympanum.
- b*, The malleus, with its manubrium, and long and short processes.
- c*, The long process of the incus.
- d*, The stapes fixed in the fenestra ovalis.
- e*, The fenestra rotunda.
- f*, The semi-canal for lodging the tensor tympani.
- g*, The exit of the canalis FALLOPII.
- h*, The part which gives origin to the styloid process.
- i*, Part of the Eustachian tube.

VOL. II.

FIG. 17.

The Under Part of the TEMPORAL BONE, seen from the Outer Side, after the ANNULUS and small BONES of the EAR have been removed.

- a, a, a*, The edge to which the annulus and pars squamosa were connected.
- b—f, b—g*, The tympanum.
- b*, The prominence between the vestibule and cochlea.
- c*, The promontory or prominence over the cochlea.
- d*, The prominence over the canal of Fallopius.
- e*, The prominence over the sheath or receptacle of the musculus stapedius.
- f*, Part of the tympanum belonging to the pars squamosa.
- g*, The semi-canal of the tensor tympani.
- h*, The fenestra ovalis.
- i*, ———— rotunda.
- k*, Part of the EUSTACHIAN Tube.
- l*, The foramen stylo-mastoideum.
- m*, The canalis caroticus.
- n*, The fossa of the jugular vein.

FIG. 18.

The BOTTOM of the TYMPANUM, with the CANALIS FALLOPII, and RECEPTACLE of the MUSCULUS STAPEDIUS cut longitudinally.

- a*, Part of the Fallopiian canal, which passes by the tympanum.
- b*, The exit of this canal, or the foramen stylo-mastoideum.
- c*, The receptacle of the stapedian muscle, or the eminentia pyramidalis tympani.

FIG. 19.

The BONE in the Bottom of the TYMPANUM, incrusting the LABYRINTH, is removed with the CANALIS FALLOPII, and EMINENTIA PYRAMIDALIS, that the LABYRINTH may entirely appear.

- a—c*, The labyrinth.
- a, b, c*, The semicircular canals; *a*, the superior; *b*, the exterior; *c*, the posterior.
- d*, The vestibule.
- e*, The cochlea.
- f*, The fenestra ovalis.
- g*, ———— rotunda.

FIG. 20.

The same TEMPORAL BONE which is exhibited in Fig. 15, shewn here from the Inner Side.

- a*, The pars squamosa.
- b*, The zygomatic process.

K.

c, The

- c*, A projection of the superior femicircular canal.
d, ————— posterior femicircular canal.
e, The meatus auditorius internus, or common canal of the acoustic nerve, and communicans faciei.
f, The beginning of the Fallopian canal.
g, The exit or external orifice of the aquæductus vestibuli.
h, ————— cochlea.

FIG. 21.

The PARS SQUAMOSA, and the BONE which incrustated the LABYRINTH and common CANAL of the former Figure removed.

- a—e*, The labyrinth.
a, b, c, The osseous femicircular canals; *a*, the superior; *b*, the posterior; *c*, the exterior.
d, The vestibule.
e, The cochlea.
f, The meatus auditorius internus.
g, The beginning of the canalis Fallopii, which runs through the tympanum.

FIG. 22.

A SECTION of the CANALIS NERVORUM COMMUNIS.

- a, a*, The longitudinal section of the canalis nervorum communis.
b—f, The bottom of the common canal divided into two unequal sized cavities, by an intermediate spine.
b, The spine separating the two cavities.
c, d, The larger cavity, the back part of which is opposed to one of the gyri of the cochlea, the fore-part forms the base of the modiolus.
e, The smaller cavity.
f, A foramen in the smaller cavity, which is the beginning of the canalis Fallopii.

The other parts are nearly the same as in the former Figure.—See also Tab. LXXIXA. Fig. 1.

FIG. 23.

The CANALIS NERVORUM COMMUNIS, to shew the entire LABYRINTH.

- a—e*, The labyrinth.
a, b, c, The femicircular canals; *a*, the superior; *b*, the posterior; *c*, the exterior.
d, The vestibule, the letter points also at the bottom of the canalis nervorum communis, which forms the basis of the modiolus.
e, One of the gyri of the cochlea.
e, The cochlea; the *e* under *d* is placed over part of the cochlea opposed to the fenestra rotunda.
f, The beginning of the Fallopian canal.

FIG. 24.

The EAR, seen from its outer and fore part, in a dried Preparation.

- a*, A portion of the squamous part of the temporal bone.
b, The mastoid, and,
c, The styloid processes.
d, The under end of the condyloid or articular cavity, concealing the cavity of the internal carotid artery, and internal jugular vein.
e—b, The outer ear; *e*, the helix; *f*, the antihelix; *g*, the lobe of the ear; *h*, the concha.
i, i, The meatus auditorius, laid open to its bottom.
k, The connection of the cartilage of the ear to the osseous part of the meatus externus.
l, The membrana tympani, fixed in an osseous groove, at the inner end of the meatus externus, and hollow near its middle, where it is connected to the under end of the malleus, which is seen shining through it.
m, A section of the carotic canal.
n, The point of the pars petrosa. At the under side of the membrana tympani, the labyrinth is exposed, with its passages laid open, of which the following appear in this view; viz.
o, The superior, and,
p, The exterior femicircular canal.
q, The vestibule.
r, r, The cochlea.
s, The beginning of the canalis Fallopii.

FIG. 25.

The TYMPANUM and LABYRINTH, viewed from the upper and fore part, after removing the OSSEOUS SUBSTANCE which covered them.

- a, a*, The membrana tympani, with the light shining through it from the outside; shewing at the same time the boundary of the tympanum.
b, The incus, with the os orbiculare at its under extremity; the stapes being removed to procure a view of the vestibule.
c, The malleus, joined to the incus and to the membrana tympani.
d, c, f, The three femicircular canals laid open; *d*, the vestibule; *e*, the horizontal; and, *f*, the oblique canal.
g, The vestibule, also laid open.
h, h, A section of the meatus auditorius internus.
i, The beginning of the canalis Fallopii.
k—p, The different turns of the cochlea; *k, k*, the scalæ; *l*, the lamina spiralis, complete behind; the osseous part only is represented before; *m*, the modiolus; *n*, the partition between the first and second gyri of the cochlea; *o*, The second gyrus, in which are seen the two scalæ, with the lamina spiralis between them;
p, the

- p*, the infundibulum, with the hamulus, or termination of the lamina spiralis projecting in it.
q, The passage of the internal carotid artery.
r, The point of the pars petrosa.
s, t, The passage of the lateral sinus; *t*, the part where it goes through the cranium.
u, v, The cells of the bone.

FIG. 26.

The OS TEMPORIS, so prepared as to shew the LABYRINTH, &c. from the upper and outer side.

- a*, A section of the meatus externus.
b, b, The bottom of the tympanum.
c, The fenestra ovalis, the rotunda being concealed in this oblique view.
d, e, f, A bristle put into the aqueduct of FALLOPIUS; *d*, its entrance at the bottom of the meatus internus; *e*, its continuation at the inner and back part of the tympanum; *f*, its exit at the foramen stylo-mastoidæum.
g, A section of the cochlea.

- b, i, k*, The three semicircular canals; *b*, the superior, and, *i*, the exterior cut open; *k*, the interior.
l, l, A section of the bone.
m, The mastoid process.
n, A section of the pars petrosa.
o, The canalis caroticus.

FIG. 27.

A section of the TEMPORAL BONE of a CHILD, shewing the TYMPANUM, with the OSSICULA TYMPANI in situ. from the fore, inner, and back part.

- a*, The squamous process.
b, The part which forms the future mastoid process.
c, The zygomatic process.
d, A section of the pars petrosa.
e, The ring of bone which surrounds,
f, The membrana tympani.
g, The malleus with its handle fixed to the membrana tympani.
h, The incus articulated with,
i, The stapes, by the intervention of the os orbiculare.
k, The vestibule laid open.

T A B L E LXXIXA.

VIEWS of the ORGAN of HEARING continued.—All the Figures belong to the Right Side of the HEAD.

FIG. 1.

Shews the Passages for the BRANCHES of the PORTIO MOLLIS into the COCHLEA and VESTIBLE; and the Cavity of the VESTIBLE laid open by removing a Portion of the Inner and Back Part of the OS PETROSUM.

- a, a,* A section of the os petrosum.
- b, b,* The bottom of the canal which contains the right branches of the auditory or seventh pair of nerves.
- c,* The beginning of the canal for the portio dura of the seventh pair.
- d, e,* A cribriform plate, through which the branches of the portio mollis of the seventh pair pass into the cochlea.
- f,* The continuation of that plate, forming the centre and bottom of the cavity of the modiolus.
- g, h,* Cribriform plates, through which branches of the portio mollis pass into the vestibule.
- i, i,* The cavity of the vestibule laid open by cutting away the bone which covers its posterior part.
- k,* The foramen ovale.
- l,* A probe passed from the vestibule into the scala vestibuli of the cochlea.
- m,* The anterior and, *n,* the posterior opening of the superior semicircular canal.
- o,* The upper, and, *p,* the under end of the posterior semicircular canal.
- q,* The termination of the tube which is common to the superior and posterior semicircular canals.
- r,* The anterior, and, *s,* the posterior extremity of the exterior semicircular canal.

FIG. 2.

A View, from above, of the COCHLEA, after removing part of the OS PETROSUM.

- a, a,* A section of the os petrosum.
- b,* Part of the canal for the internal carotid artery.
- c, c,* The side of the cochlea viewed somewhat obliquely.
- d, e, f, g,* The outer part of the modiolus, which is cribriform or pierced with holes, for the passage of the branches of the portio mollis.
- h,* A wire passed between two lamellæ of which the modiolus consists.

- i,* The osseous septum between the first and second gyrus of the cochlea, composed of two plates.
- k,* The osseous septum which separates the second gyrus from the infundibulum.
- l,* The first turn of the osseous part, or root of the lamina spiralis.
- m,* Part of the lamina spiralis cut, to shew that it is composed of two plates, between which branches of the portio mollis are lodged, which afterwards pass through the minute holes seen on the edge of the under part of the lamina.
- n,* The second turn of the osseous part of the lamina spiralis.
- o,* The hamulus, or termination of the lamina spiralis.
- p,* The infundibulum.
- q, r,* The first and second scala of the tympanum.
- s, t,* The first and second scala of the vestibule.

FIG. 3.

Represents the COCHLEA from the Fore and Outer Part, after removing a Portion of the OS PETROSUM.

- a,* The fore and outer side of the os petrosum.
- b,* The basis of the cochlea.
- c,* The scala tympani.
- d,* The outer edge of the osseous part of the lamina spiralis, perforated by innumerable holes for the passage of nerves.
- e,* A ridge in the middle of the osseous part of the lamina spiralis, produced by a separation of the plates which compose it.
- f,* The scala vestibuli.
- g,* The osseous septum which divides the first from the second gyrus of the cochlea.
- h,* The second gyrus of the cochlea.
- i,* The hamulus of the lamina spiralis.
- k,* The infundibulum.

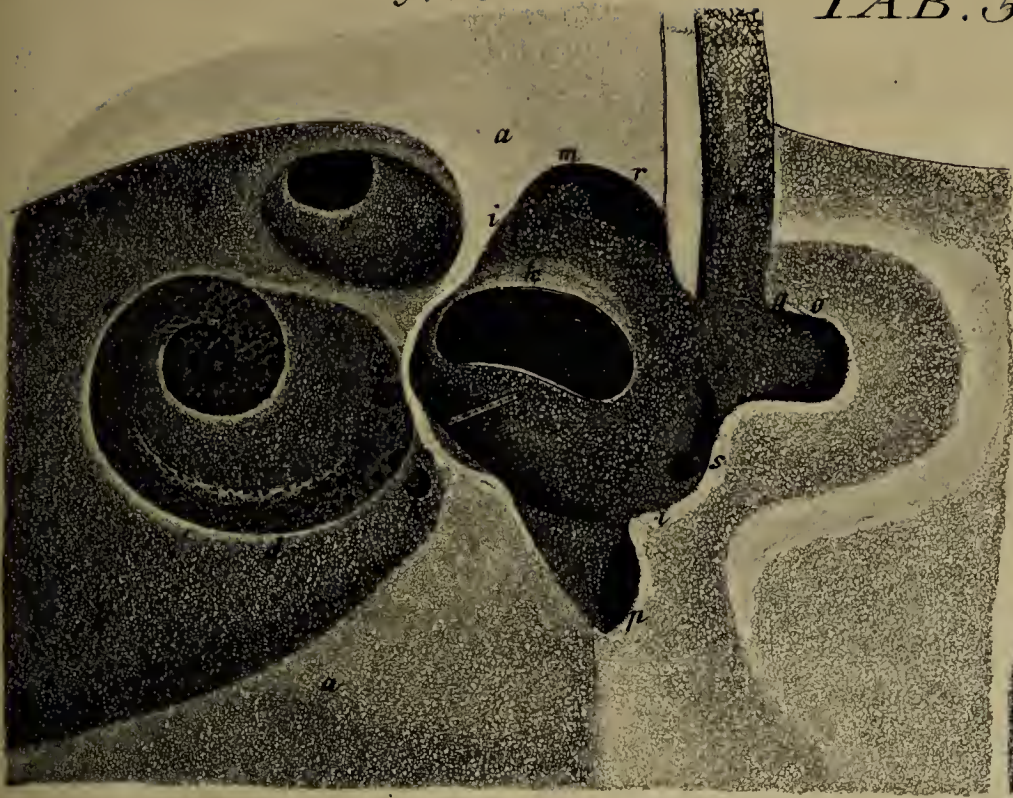
FIG. 4.

Represents the Distribution of the BRANCHES of the PORTIO MOLLIS in the COCHLEA.

- a,* The modiolus.
- b, b,* The plexus of nerves on the osseous part of the lamina spiralis.

c, The

Fig. 1.



79A.
TAB. 52B.

Fig. 2.

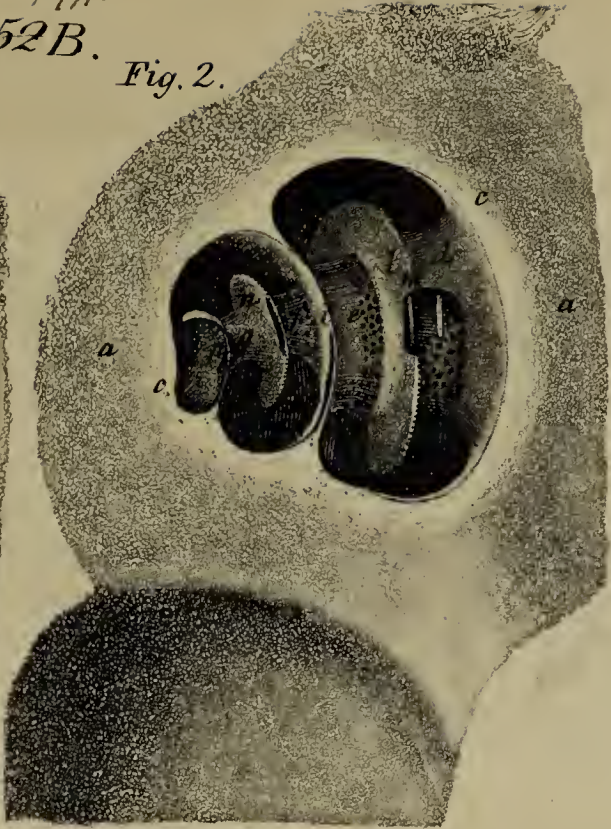


Fig. 3.



Fig. 4.



Fig. 5.

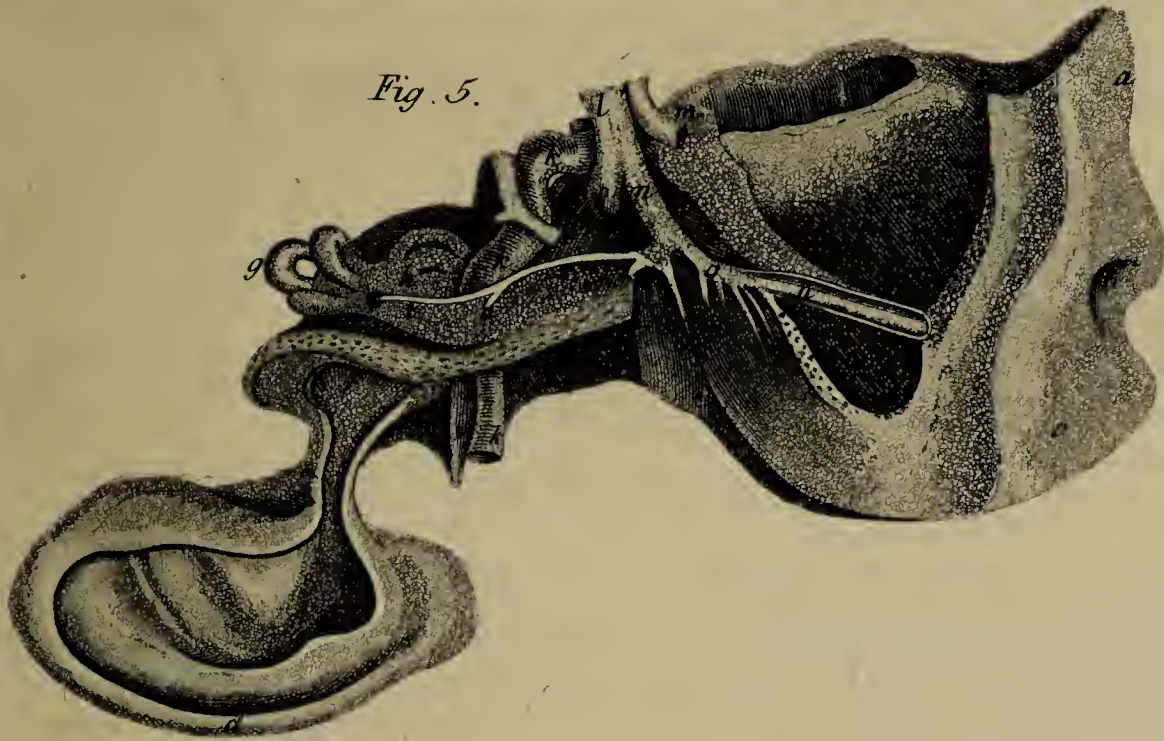


Fig. 6.

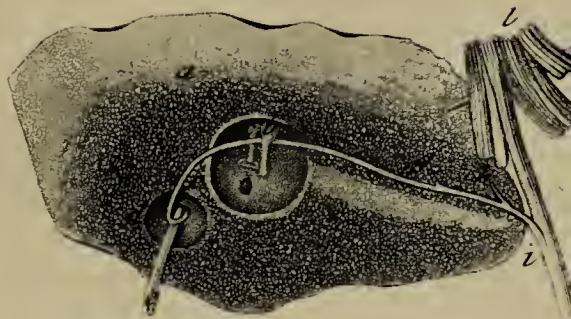
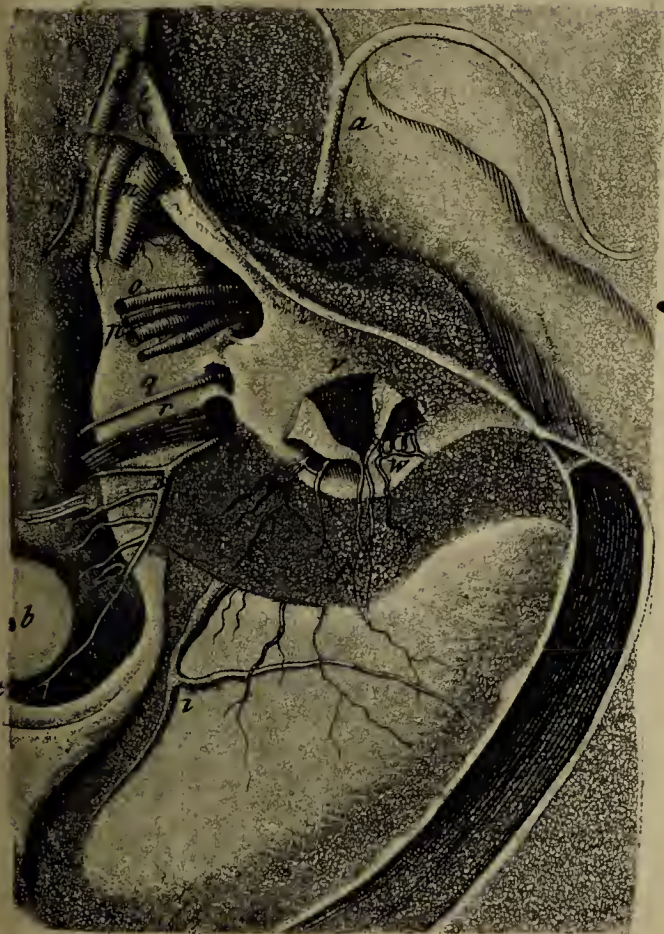


Fig. 7.



- c*, The plexus of nerves on the outer and softer part of the lamina spiralis.
d, e, f, The outer part of the lamina spiralis dividing into its two constituent membranes; *d*, the part continued to line the scala vestibuli; and, *f*, the part continued to line the scala tympani.

FIG. 5.

The EAR of a Child so prepared as to shew the NERVE contained in the CANALIS PTERYGOIDEUS of the SPHENOID BONE, which joins the Second Branch of the Fifth Pair to the first Ganglion of the GREAT SYMPATHETIC NERVE, and to the PORTIO DURA of the Seventh Pair.

- a, b, c*, The side of the nose and upper lip.
d, The outer ear.
e, The meatus externus laid open.
f, The membrana tympani.
g, The three semicircular canals.
h, The cochlea.
i, The tympanum.
k, The internal carotid artery.
l, The trunk of the fifth pair of nerves.
m, n, o, The three branches of the fifth pair, the first and third of which are divided.
p, The infra-orbital branch of the second of the fifth.
q, Descending branches from the second of the fifth.
r, The nasal branch of the second of the fifth, running towards the inner part of the nose.
s, A branch reflected from the second branch of the fifth through the canalis caroticus.
t, A branch from the branch *s*, which joins the portio dura of the seventh pair.
u, A branch descending from *s*, to terminate in,
v, The uppermost cervical ganglion of the great sympathetic nerve.

FIG. 6.

The CHORDA TYMPANI joining the PORTIO DURA of the Seventh Pair to the LINGUAL BRANCH of the Third Branch of the Fifth Pair; the BONE which covered it behind and before the TYMPANUM being removed.

- a*, The temporal bone.
b, The malleus.
c, The incus.
d, The foramen stylo-mastoideum.
e, The portio dura of the seventh pair.

- f*, The rise of the chorda tympani.
g, h, Small nerves connected with the chorda tympani.
i, The termination of the chorda tympani in,
k, The lingual branch of the third branch of the fifth pair of nerves.
l, The trunk of the third pair.

FIG. 7.

The Right Posterior Part of the Inner Side of the Base of the SKULL covered with the DURA MATER, in which the Membranous Cavity of the AQUÆDUCTUS VESTIBULI is seen opened, with the LYMPHATIC VEINS which arise from it, and the TRUNKS of all the NERVES which proceed from the BRAIN, from the Third to the Ninth Pair.

- a*, The principal artery of the dura mater.
b, The beginning of the spinal marrow separated from the medulla oblongata.
c, e, The right lateral sinus opened, the tentorium being cut off.
f, The remaining broader part of the lateral sinus descending behind the right os petrosum, covered with the dura mater.
g, The part under which is the extremity of the lateral sinus, terminating in the diverticulum of the jugular vein.
h, The triangular orifice of the superior petrosal sinus, by which it communicates with the lateral sinus.
i, The posterior artery of the dura mater.
k, The right nerve of the third pair.
l, The nerve of the fourth pair.
m, ————— fifth pair.
n, ————— sixth pair.
o, The portio dura of the seventh pair.
p, The portio mollis of the seventh pair.
q, The nervus glosso-pharyngeus of the eighth pair, penetrating under the entrance of the inferior orifice of the aquæductus cochleæ.
r, The pars vaga of the eighth pair.
s, The nervus accessorius of the eighth pair;
t, Its root from the spinal marrow.
u, The nerve of the ninth pair.
v, The membranous cavity of the aquæductus vestibuli opened.
w, w, Small lymphatic veins, according to the author of the figure, filled with quicksilver, arising from the membranous cavity of the aqueduct, and spread over the lateral sinus.

TABLE

T A B L E LXXIXB.

Different VIEWS of the ORGAN of HEARING, in addition to those exhibited in the former TABLES.

FIG. 1.

Represents the EXTERNAL EAR, with the Parotid Gland and its Ducts.

The letters of this figure, from A to H, point out the same parts shewn in Tab. LXXVII. Fig. 1.

- I, I, The parotid gland.
- K, L, The lymphatic glands.
- M, The duct of the parotid gland.
- N, The orifice of the duct opening into the cavity of the mouth.

FIG. 2.

Gives a View of the Posterior Part of the EXTERNAL EAR, the MEATUS EXTERNUS, the TYMPANUM, with its Small Bones, and the EUSTACHIAN TUBE of the Right Side.

- A, The glandulæ ceruminosæ, with their reticular substance.
- B, The incus.
- C, The malleus.
- D, Part of the mastoid sinuosity, to which the short process of the incus is joined.
- E, The chorda tympani.
- F, The membrana tympani.
- G, H, I, The Eustachian tube.

FIG. 3.

The CARTILAGE of the EAR, and the Cartilaginous Part of the MEATUS EXTERNUS, stripped of their coverings.

- A, The cartilage of the ear.
- B, The cartilaginous passage somewhat flattened.
- C, That part of the cartilage which forms the beginning of the meatus.
- 1. 2. 3. The three fissures of the cartilaginous passage.

FIG. 4.

The Back Part of the EAR, and the Upper Part of the CARTILAGINOUS PASSAGE, with the LIGAMENT which ties the CONCHA to the TEMPORAL BONE.

- A, A, The back part of the ear.
- B, B, ————— concha, divested of the skin.
- C, C, The appendices which terminate the cartilage in the upper part.
- D, The superior part of the passage, with the glandulæ ceruminosæ.
- E, The ligament of the ear reversed.

FIG. 5.

Represents the Back Part of the EAR, the parts which connect it to the Head, and the Membrane which lines the Meatus Externus.

FIG. 6.

The Under and Back Part of a Portion of the Temporal Bone.

- A, The squamous process cut towards its fore-part.
- B, The styloid process.
- C, The pars petrosa.

FIG. 7.

A Section of the TEMPORAL BONE, to shew the TYMPANUM and EUSTACHIAN TUBE.

- A, The tympanum.
- B, The fenestra ovalis, and,
- C, The fenestra rotunda, leading from the tympanum to the labyrinth.
- D, The osseous part of the Eustachian tube;
- E, Its cartilaginous extremity;
- F, Its membranous part turned back.

FIG. 8.

Represents the Outer Part of the TEMPORAL BONE of a Fœtus.

- A, The pars squamosa.
- B, The zygomatic process.
- C, The pars petrosa.
- D, D, The bony ring which receives the membrana tympani.
- E, The fenestra ovalis.
- F, ————— rotunda.

FIG. 9.

Represents the TEMPORAL BONE, cut perpendicularly downwards, in such a way as to shew the depth of the TYMPANUM, and the Vessels spread out upon the Membrane which lines it, together with the CELLS of the MASTOID PROCESS.

- A, B, The tympanum.
- C, The posterior extremity of the Eustachian tube.
- D, An opening from the cells of the mastoid process.

FIG.



FIG. 1.

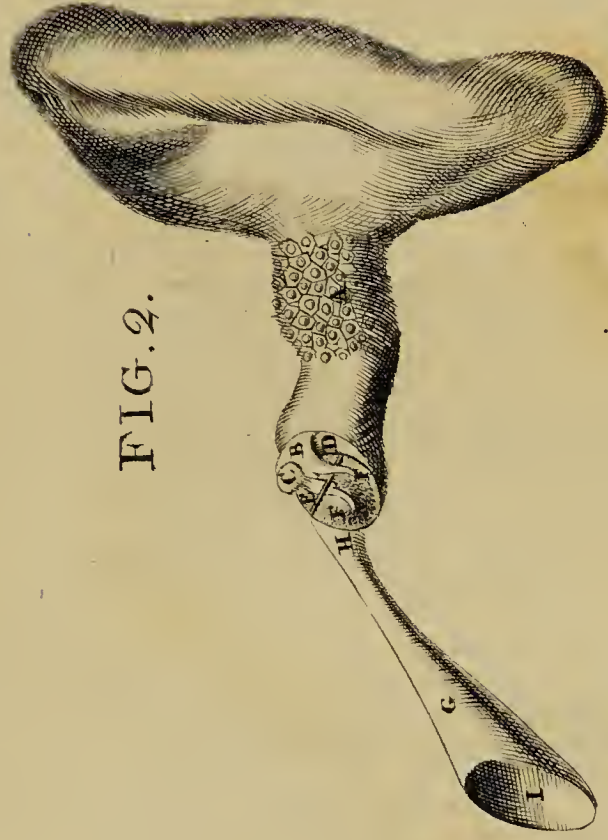


FIG. 2.



FIG. 3.



FIG. 4.

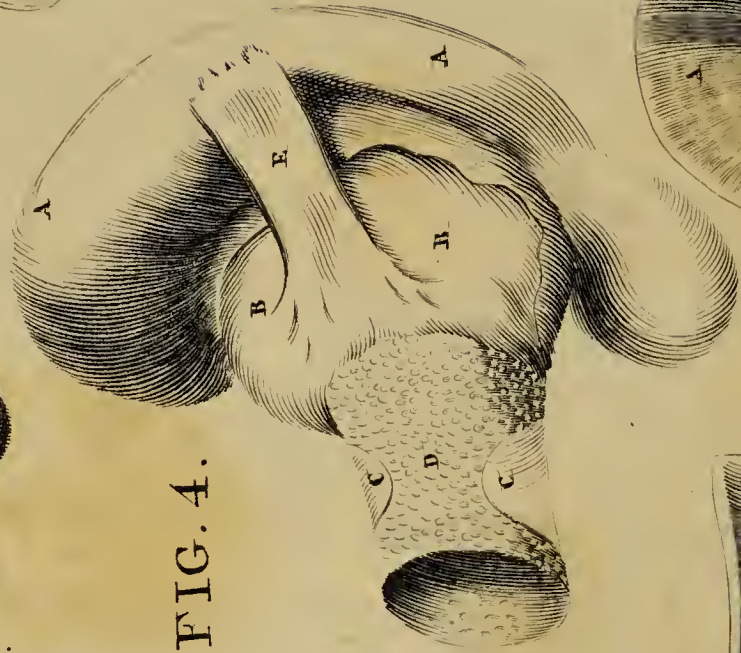


FIG. 5.

FIG. 6.



FIG. 7.

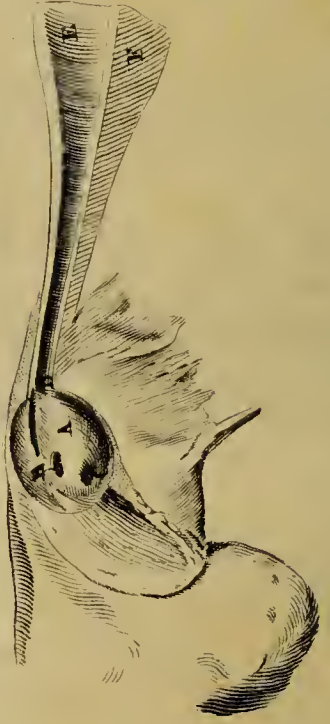


FIG. 8.

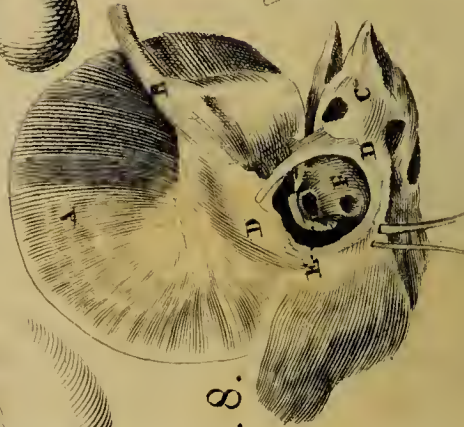


FIG. 9.



FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.

FIG. 16.

FIG. 17.

FIG. 18.



FIG. 19.



FIG. 20.

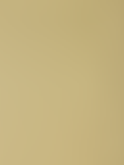
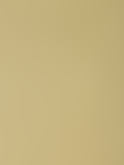
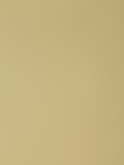
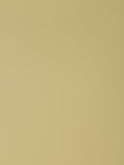




FIG. 26.



FIG. 27.



FIG. 28.



FIG. 29.



FIG. 30.

FIG. 31.

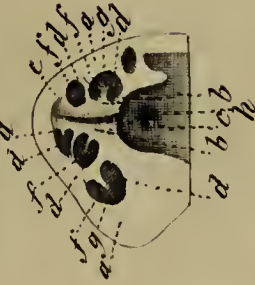


FIG. 32.



FIG. 33.



FIG. 34.



FIG. 35.



FIG. 37.

FIG. 38.

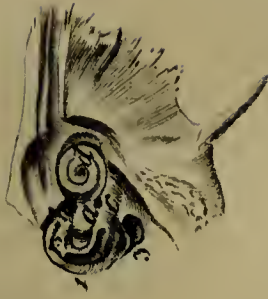


FIG. 10.

The MALLEUS, with the Eminences and Cavity which serve for its Articulation.

- a*, Its head ;
- b*, Its handle ;
- c*, Its large process ;
- 1. Its first eminence ;
- 2. Its second eminence ;
- 3. The cavity between the two eminences.

FIG. 11.

A View of the opposite side of the same Malleus with that of Fig. 10.

FIG. 12.

The INCUS, viewed on the side by which it is articulated with the MALLEUS.

- a*, The body of the incus, with the eminences and cavity for articulation.
- b*, The short branch, fore-shortened.
- c*, The long branch.

FIG. 13.

A Lateral View of the INCUS.

- a*, The short,
- b*, The long process.
- c*, The os orbiculare adhering to the long process.
- d*, The cavity for articulation with the malleus.

FIG. 14.

The Under End of the INCUS, with the Os Orbiculare and Head of the Stapes.

- a*, The long process of the incus.
- b*, The os orbiculare.
- c*, The head of the stapes.

FIG. 15.

Shews the Base, Crura, and Head of the Stapes.

FIG. 16.

The Base of the Stapes inverted, to shew that it is somewhat Concave.

FIG. 17.

The small Bones of the EAR, articulated with each other, and viewed Posteriorly.

- a*, The body of the incus ;
- b*, Its short branch, seen in front ;

c, Its long branch, articulated with the stapes, by the intervention of the os orbiculare.

d, The handle of the malleus.

e, The base of the stapes.

FIG. 18.

The small Bones of the EAR, viewed Anteriorly.

a, The head of the malleus ;

b, Its handle ;

c, The long branch of the incus.

d, The base of the stapes.

FIG. 19.

A View of the Fore-part of the MALLEUS, and its MUSCLES.

a, The head of the malleus ;

b, Its handle.

c, The external muscle of the malleus ;

d, Its insertion.

e, The internal muscle, with its sheath opened.

f, The curvature of the internal muscle, before its insertion into the handle of the malleus.

g, The large process of the malleus.

h, The small process, into which the external muscle is fixed.

FIG. 20.

The MALLEUS, with its two Muscles, the Eye being supposed to be placed in the Eustachian Tube.

a, The malleus.

b, The external muscle of the malleus.

c, The internal muscle.

FIG. 21.

The STAPES, with its Muscle.

a, The stapes ;

b, Its muscle.

From Fig. 10. to Fig. 21. inclusive, the small Bones of the Ear are represented somewhat larger than nature.

FIG. 22.

Represents the Fore-part of the Temporal Bone of a Fetus.

A, The squamous process, the small bony fibres of which are easily distinguished.

2. 3. The sides of its circumference, which are yet cartilaginous.

B, The zygomatic process.

C, The membrana tympani.

D, The bony ring which receives the membrana tympani.

E, The styloid process, as yet cartilaginous.

F, The

- F, The mastoid process, very small.
 4. The foramen, through which the portio dura passes out.
 G, This letter marks an obscure line, which is the part where the squamous is separated from the mastoid process. These two bony parts are firmly united in adults.
 H, The canal which incloses the internal carotid.
 I, The foramen, where the tube which goes from the ear to the palate is connected.

FIG. 23.

Represents the Temporal Bone, from which the Squamous Part and Membrane Tympani are cut off, and as much of the Body of the Bone as is necessary to give a view of the Tympanum and Small Bones of the Ear.—See Tab. LXXVII. Fig. 7.

FIG. 24.

Represents the Inner Side of the Temporal Bone, with as much of it cut off as was necessary to shew the Membrana Tympani, upon which the Malleus and Incus are seen, with the Nerve called Chorda Tympani, and the Tendon of the External Muscle of the Malleus;—all of them in situ.

A,—F, point out similar parts explained Tab. LXXVII. Fig. 8.

- G, The meatus auditorius internus.
 1. The tendon of the external muscle of the malleus.
 2. 3. The chorda tympani.

FIG. 25.

The Temporal Bone prepared, so as to shew the Cochlea, Vestible, and Semicircular Canals in situ.—See Tab. LXXVII. Fig. 12.

FIG. 26.

The Covering of the Cochlea taken off, to shew its Semi-oval Spiral Canal.

FIG. 27.

A Section of the Mastoid and Petrosal Processes, to shew several Parts belonging to the Tympanum.

- a, The canal for one of the muscles of the malleus.
 b, A section of the Eustachian tube.
 c, ————— aqueduct of Fallopius.
 d, The foramen ovale.
 e, ————— rotundum.
 f, The canal for the muscle of the stapes.
 g, The styloid process.
 h, The foramen stylo-mastoideum; the dotted lines running from it mark the canal of the portio dura of the seventh pair of nerves.

- i, The cells of the mastoid process.
 k, The mastoid sinus.

FIG. 28.

The Internal EAR opened transversely.

- a, Part of the meatus externus.
 b, ————— membrana tympani.
 c, The external muscle of the malleus.
 d, The chorda tympani.
 e, The malleus.
 f, The incus.
 g, The articulation of the incus with the os orbiculare, and of the os orbiculare with the stapes.
 h, The base of the stapes, fixed in the foramen ovale.
 i, The muscle of the stapes.
 k, The orifice proper to the superior semicircular canal.
 l, ————— of the posterior canal.
 m, ————— common to the superior and posterior canals.
 n, The superior orifice of the exterior canal.
 o, The inferior orifice of that canal.
 p, A section of the aqueduct of Fallopius.

FIG. 29.

The Vestible and Cochlea of a Child, laid open on the Side next the Cavity of the Cranium.

- a, The orifice of the superior semicircular canal.
 b, ————— posterior canal.
 c, The orifice common to the superior and posterior canals.
 d, The outer orifice of the exterior canal.
 e, The inner orifice of that canal.
 f, The foramen ovale.
 g, The orifice of the scala vestibuli.
 h, The lamina spiralis.
 i, The membranaceous part of the lamina spiralis.
 k, The perforated part of the cochlea, for the passage of nerves.

FIG. 30.

Represents a Section of the Cochlea, to shew its Spiral Process.

- a, The beginning of the scala tympani.
 b, c, The first and second turns of the scala tympani.
 d, e, ————— vestibuli.
 f, g, The first and second turns of the osseous part of the lamina spiralis, the membranaceous part being removed.
 h, The extremity, or hamulus, of the lamina spiralis.
 i, That portion of the pars petrosa which covers the cochlea.

FIG. 31.

The Cochlea, cut from its Base to its Centre.

- a, a, The bone which incloses the cochlea.
 b, b, The

- b, b*, The modiolus, or nucleus.
c, The cavity of the modiolus.
d, d, d, d, The scala tympani;
e, Its extremity.
f, f, f, f, The scala vestibuli.
g, g, The lamina spiralis of the first turn of the cochlea;
 —the same is seen in the other turns.
h, The meatus auditorius internus.
i, The aqueduct of Fallopius.

FIG. 32.

The Temporal Bone of a Fœtus of four Months, with the Small Bones of the Tympanum, in their natural situation.

- a*, The malleus.
b, The incus.
c, The os orbiculare.
d, The stapes.
e, The canal for the muscle of the stapes.
f, The foramen rotundum.
g, The canal for the internal muscle of the malleus.

- h*, The osseous ring, to which the membrana tympani is fixed.

FIG. 33.

A Back View of the Temporal Bone of a Fœtus.

- A*, The pars squamosa.
B, B, The part where it is separated from the pars petrosa.
C, The superior semicircular canal, seen without any preparation.
D, The posterior semicircular canal.
E, The point of communication.
F, A considerable fossa, which is situated under the superior canal, and which is filled up and effaced as the fœtus grows older.
G, The foramen in the passage of the portio dura.
H, ————— of the auditory nerve.

FIG. 34. and 35.

See Tab. LXXVIII. Fig. 1. 2.

OF THE MOUTH AND THROAT, WITH THEIR APPENDAGES.

MOUTH.

THE *Osseous Parts* of the Mouth are,—the *Ossa Maxillaria Superiora*, the *Ossa Palati*, the *Maxilla Inferior*, and the *Teeth*;—all of which, except the Teeth, have been already described.

The *Soft Parts* of the Mouth consist of the *Lips* and *Cheeks*, the *Gums*, the *Palate*, the *Velum Palati*, the *Uvula*, the *Tongue*, the *Membrane* lining the Mouth, and the *Salivary Glands*.

The *Lips* and *Cheeks* are principally composed of Muscles, are covered on the outside by the common Integuments, and lined within by the Membrane of the Mouth, under which there are numerous Mucous Glands, obtaining their names from their situations.

The intervening space between the Masseter and Buccinator is occupied by a large quantity of Fat, which gives form to the Face.

The *Membrane* of the Mouth is covered with fine *Villi*; but these are most conspicuous upon the edges of the Lips, as may be distinctly seen after a fine Injection, or after macerating the parts till the Cuticle can be separated. Tab. LVI. Fig. 13.

From the edges of the Lips, the common Integuments, now become extremely thin, are converted into the Membrane which lines the Mouth, and which, opposite to the middle Dentes Incisores of the Upper and Under Jaws, forms two Doublings or *Fræna*, which fix the Lips more firmly to the Jaws.

The Lips are serviceable in the general purposes of speaking, eating, drinking, &c.

The *Gums* cover the sides of the Alveolar Border of both Jaws, pass in between the different Teeth, and surround and adhere firmly to the Collar of each.

The Substance of the Gums is of a dense nature, and very Vascular, and the Vessels are united by a compact Cellular Substance.

They may be said to consist of the common Membrane of the Mouth and the Periosteum of the Jaws intimately connected.

They serve as a Covering to the Jaws, and contribute to the security of the Teeth.

The *Arteries* of the Lips, Cheeks, and Gums, are from the Facial, Temporal, and Internal Maxillaries, which are derived from the External Carotids.

The *Veins* go chiefly to the External, and partly to the Internal Jugulars.

The *Nerves* come from the first and second Branches of the Fifth Pair, and also from the Portio Dura of the Seventh Pair.

The *Palate* is divided into the *Palatum Durum* and

Palatum Molle. The former is composed of the Palate-plates of the Upper Jaw, and is covered by the Periosteum and common Membrane of the Mouth, which prevent the Bones from being injured.

The Membrane which covers the Bones of the Palate forms numerous *Rugæ*, which assist in the division of the Food.

It is nearly of the same structure with that of the Gums, but perforated by the Ducts of the Palatine Glands, for the excretion of Mucus, which serves to lubricate the Palate, and assists in dissolving the Food.

The *Palatum Molle*, *Velum Pendulum Palati*, or *Soft Palate*, is that part which depends from the posterior edge of the *Ossa Palati*, and from the Pterygoid Processes of the Sphenoid Bone, and forms a Partition between the Nose and Mouth. Tab. XLVII. Fig. 10. *d, d*.—Tab. LXVIII. No. 47.

It is composed of the Membranes which line the Nose and Mouth, and of the Expansions of the Circumflexi and Levatores Palati, and likewise of numerous Mucous Glands, which serve to lubricate the Mouth and Throat, and facilitate Deglutition. Tab. XLIX. Fig. 5, *b*.—Tab. XLVII. Fig. 14.

The *Palatum Molle* conducts the Fluids of the Nose into the Mouth, and acts like a Valve in preventing what we swallow from passing into the Nose.

In the middle of the posterior edge of the *Velum Palati*, the *Uvula*, or *Pap of the Throat*, takes its origin, and hangs pendulous from the Velum over the root of the Tongue. Tab. XLVII. Fig. 15. *d*.—Tab. LXVIII. No. 49.

It is of a Conical form, is covered by the Membrane of the Mouth, and has a small Muscle within it, by which it is elevated and shortened;—its other motions depending upon the Muscles of the Palate.

The use of the Uvula in Speaking and in Deglutition is evident from the inconveniencies which result from its being destroyed by disease.

The *Arteries* of the Palate, &c. come from the Facial and Internal Maxillary.

The *Veins* go to the External and Internal Jugulars.

The *Nerves* are chiefly from the second of the Fifth, with some Twigs from the Eighth Pair.

TONGUE.

The *Tongue* is of an *Oval form*, and is divided into *Base*, *Body*, and *Apex*.

The *Base*, or posterior part of the Tongue, is connected to the Os Hyoides, and, by the medium of this, to the adjacent Bones and Muscles.

The

The *Body*, or middle part of the Tongue, terminates anteriorly in the loose moveable point.

On the Dorsum or Upper Surface, there is a *Linea Mediana*, or middle Groove, running longitudinally, and dividing it into two lateral Convexities.

The inferior Surface, which reaches only from the middle of the Tongue to the point, is connected to the parts below it by the Sublingual Ligament, or *Frænum Linguae*, which is a Doubling of the Skin or lining of the Mouth.

The sides of the Tongue are fixed to the Lower Jaw and Styloid Processes, and parts adjacent, by *Membranous Ligaments*.

The Tongue is chiefly composed of the Fibres of the Muscles which serve for its motions.—These Fibres are disposed in various directions, and intermixed with Medullary Fat.

The upper and lateral parts of the Tongue are composed of the Stylo-Glossi.—Its middle portion, between the two former Muscles, is formed of the Linguales.—The lower part is chiefly formed of the Genio-Glossi;—and behind, the Stylo-Glossi enter into its composition. Tab. XLIX. Fig. 4.

The Tongue is covered by a continuation of the common Integuments, which are preserved soft and moist by the Saliva.

The Cuticle of the Tongue forms Vaginæ for receiving the Substances called *Papillæ*.

The Corpus Mucosum of the Tongue is thicker than in other parts of the Body, but more moist.

The third Covering of the Tongue, the Cutis Vera, is very plentifully supplied with Nerves.—The *Papillæ*, which take their origin from it, are very Vascular, especially near the Apex of the Tongue, but are wanting on its under Surface.

The *Papillæ* are divided into three kinds, the *Maximæ*, *Mediæ*, and *Minimæ*.

The first class, called *Papillæ Maximæ*, *Lenticulares*, *Capitatae*, vel *Vallatae*, are by much the largest, and of a Lenticular form, having round Heads and short Stems. Tab. XLIX. Fig. 5. *f*.

They are placed at the Base of the Tongue, in superficial Fossulæ, and the whole are arranged in such a manner as to form an angle with its point backwards. Tab. LXXXII. Fig. 20.

They are Glands of the Salivary kind, and have each of them a small Perforation in the middle of its convex Surface.

Besides the *Papillæ Capitatae*, there are numerous *Mucous Follicles*, which cover the greater part of the Surface of the root of the Tongue.

At the root of the Tongue, and behind the Angle formed by the *Papillæ Maximæ*, there is a Hole called *Foramen Cæcum* of MORGAGNI, by whom it was first described. Tab. LXXX. Fig. 8. *m*.—Tab. LXXXII. Fig. 20.

It penetrates only a small way into the Substance of

the Tongue, and receives the Mouths of several Excretory Ducts which terminate in it.

The second class, called *Papillæ Mediæ*, *Semi-lenticulares*, vel *Fungiformes*, are much smaller than the former, and are scattered over the upper Surface of the Tongue, at some distance from each other. Tab. LXXXII. Fig. 20.

They are of a Cylindrical form, and terminated by a round extremity. Tab. LXXXII. Fig. 17. 20.

The third class, called *Papillæ Minimæ*, vel *Conicæ*, vel *Villosæ*, are by much the most numerous, but very minute. They occupy almost the whole upper Surface of the Tongue, and are most abundant towards the Apex, where the sensation of taste is most acute. Tab. LXXX. Fig. 8.—Tab. LXXXII. Fig. 20.

This and the second class have been supposed to be formed chiefly of the extremities of Nerves, and to constitute the real Organ of Taste; though other parts, as the Palate, and even the Pharynx and Esophagus, possess the faculty of Taste in a certain degree.

The principal Blood-vessels of the Tongue are large in proportion to the size of that Organ.

They are called *Linguales*, vel *Raninæ*, on account of the dark-coloured Branches which appear under the Tongue.

The *Arteries*, which are Branches of the External Carotids, are not found to communicate so freely on the opposite sides of the Tongue, as they do in other parts of the Body.

The *Veins* open chiefly into the External Jugulars.

The *Nerves*, like the Arteries, are large and numerous, and have little connection on the opposite sides.

They come from the Fifth, Eighth, and Ninth Pairs. The first set supply the parts next the point of the Tongue, and are therefore considered as being principally concerned in conveying the sensation of Taste.

The second set supply the root, and the third the middle, of the Tongue, and are chiefly dispersed upon its Muscles. There is a considerable intermixture, however, between the three sets on the same side.

Besides being the principal Organ of Taste, the Tongue is the chief instrument of Speech, and of the articulation of the Voice.—It also assists in Manducation, Deglutition, Spitting, Sucking, &c.

The *Salivary Glands* consist of three large Glands on each side of the Face, viz.—the *Parotid*, the *Submaxillary*, and the *Sublingual*,—besides many small Glands, named from the parts to which they belong.

They are of a yellowish colour, and irregular on their Surface, being of the Conglomerate kind.

The *Parotid Gland*, which is the largest of the Salivary Glands, is named from its situation near the Ear.

It occupies the whole space between the Ear, Mastoid Process, and Angle of the Lower Jaw. Tab. LXXX. Fig. 1. *m*. Fig. 2. *p*.

It extends superiorly to the Zygoma, and anteriorly to the Masseter, part of which it covers.

The under end of it lies contiguous to the Submaxillary Gland.

From the different parts of the Gland, numerous small Branches arise, which join together to form a large Duct, sometimes called STENO's *Salivary Duct*, or *Ductus Superior*, which passes from the upper and fore part of the Gland.

The Parotid Duct is of a white colour, and large size, but, from the thickness of its Coats, the Cavity is small, in proportion to the general size of the Duct.

It passes anteriorly, in a transverse direction, over the Tendon of the Masseter, in consequence of which, it is free from compression, and descends a little to perforate the Buccinator, opposite to the second or third Dens Molaris of the Upper Jaw.

In crossing the Masseter, it receives sometimes one, sometimes two minute Ducts, from an equal number of small Glands, called by HALLER *Glandulæ Accessoriæ*. Tab. CXXXV. O.

The Submaxillary Gland is smaller and rounder than the Parotid, and is situated on the inside of the Angle of the Lower Jaw, between it and the Tendon of the Digastricus. Tab. LXXX. Fig. 2. s. Tab. CXXXI. D. Tab. CLXXXVII. X.

From the upper and fore part of this Gland, a Duct arises, called, by some Authors, *Ductus WHARTONI*, vel *Ductus Inferior*, which is much thinner in substance than the former Duct, but much longer.

It passes forwards between the Mylo-hyoideus and Genio-glossus, along the under and inner edge of the Sublingual Gland, to the side of the Frænum Linguae, and terminates behind the Dentes Incisores, by a small Orifice, in form of a Papilla.

The Sublingual Gland is smaller and softer than the Submaxillary, and is flat, and of an oval form.

It is situated under the anterior portion of the Tongue, above the Duct of the Inferior Maxillary Gland, near the Lower Jaw, between the Mylo-hyoideus and Genio-hyo-glossus; the former of which sustains it. Tab. LXXX. Fig. 2. t.

Its extremities are turned forwards and backwards, and the edges obliquely inwards and outwards.

It is covered by a continuation of the Skin of the under side of the Tongue, which fixes the Gland in its place.

It opens by several Orifices arranged in a line near the Gums, a little to the outside of the Frænum.

Sometimes this Gland sends off a Branch which communicates with that of the Submaxillary, but generally it is otherwise.

In many Quadrupeds, there is a distinct Duct belonging to this Gland, like that of the Submaxillary.

The smaller Glands of the Mouth are in great numbers, lying between the inner lining of the Mouth and its Muscles, and deriving their names from their situations.

They are much inferior in size to the former, and of a simple nature, each sending a Duct, which perforates the Skin of the Mouth, and opens into its Cavity. They consist of—

The *Buccales*, which are dispersed over the whole of the Cheek, but most plentifully near the termination of the Parotid Duct;

The *Labiales*, lying on the inside of the Lips;

The *Palatinae*, upon the Palate; and,

The *Linguales*, at the root of the Tongue.

The *Arteries* of the Salivary Glands are from different Branches of the External Carotids.

The Parotid Gland is supplied from the Temporal Artery, the Inferior Maxillary Gland from the Facial Artery, and the Sublingual Gland from the Lingual Artery.

The *Veins* of these Glands go to the External Jugulars.

Their *Nerves* are chiefly from the third part of the Fifth, and from the Portio Dura of the Seventh Pair.

The Salivary Glands serve for the secretion of the Saliva, which they pour out in large quantity, and which is promoted by the motion of the Lower Jaw. The Saliva assists in the solution of the Food in the Mouth, in lubricating the Throat for its passage downwards, and in the digestion of it in the Stomach.

OF THE TEETH.

OF THE STRUCTURE OF THE TEETH IN THE ADULT.

THE *Teeth* are situated in the *Alveoli* of the *Jaws*, and are sixteen in number in each *Jaw*. Tab. XIV.

Each *Tooth* consists of a *Base* or *Body*, and one or more *Roots* or *Fangs*; the former appearing without, the latter within the *Sockets*. Tab. XIV.

Around the *Surface*, where the *Body* ends and the *Root* begins, the *Tooth* is a little depressed where it forms the *Cervix* or *Collar* of the *Tooth*. Tab. XIV.

The *Roots* are of a *Conical* form, Tab. XIV. becoming gradually smaller as they recede from the *Body* of the *Tooth*, in consequence of which pressure is removed from the tender parts placed at their point, and divided equally over the *Surface* of the *Fangs*.

Upon the *Body* of each *Tooth*, there is an additional *Covering*, termed *Cortex Striata* or *Enamel*, which is spread over all that part of the *Tooth* that, in the healthy state, is not covered by the *gums*. Tab. LXXIXBB. Fig. 1. 2.

The *Enamel* has no *Cavity* for *Marrow*, and is so hard, that a *Saw* or a *File* impresses it with difficulty.

It is thicker towards the *Body*, and becomes gradually thinner towards the *Cervix* of the *Tooth*.

It is composed of *Fibres* so disposed as to form a kind of *Radii* round the *Body* of the *Tooth*. Tab. LXXIXBB.

The *Fibres* are straight on the cutting *Edges* and grinding *Surfaces* of the *Bodies*, but curved at the sides, with their convex part turned towards the *Fangs* of the *Teeth*, which better enables them to resist the impression of hard *Substances* placed between them during *Manducation*; nor are they, from this structure, so easily fractured by the inordinate motion of the *Jaws*.

At the point of each of the *Roots* of the *Teeth*, there is a *Foramen*, and a passage leading from it into a common *Cavity* in the *Body* of the *Tooth*, for lodging the *Vascular* and *Nervous Substance*, called *Pulp*, of the *Teeth*. Tab. LXXIXBB. Fig. 1. 2.

The *Foramen* is placed towards one side of the point, which prevents the *Vessels* and *Nerves* entering from being injured by pressure.

In old *People*, the *Foramen* is sometimes obliterated; in such cases the *Vessels* and *Nerves* are destroyed.

The shape of the *Cavity* resembles that of the *Body* of the *Tooth*, being narrow next the *Fangs*, and gradually expanding towards the opposite extremity. Tab. LXXIXBB.

The *Cavity* has no *Cancelli* nor *Marrow*, being filled with the *Pulp*, which is connected to it by *Cellular Substance*.

The *Arteries* of the *Teeth*, called *Dental*, are Branches

of the *Internal Maxillary*, the *Veins* returning from them pass into the *Internal Jugular Veins*.

After the *Arteries* have entered the *Teeth*, they are dispersed upon a *Membrane* which lines their *Cavity*, Tab. LXXIXBB. Fig. 6. as may be seen by injecting them;—by the appearance produced by age, the *Cavity* in old *People* often filling up with *Osseous Matter*, and the *Teeth* acquiring a horny transparency;—by accident, as when a *Tooth* is loosened by a blow, the *Tooth* being sometimes fixed again in its *Socket*, at other times becoming black, from its nourishing *Vessels* being destroyed;—by disease, as in *Anchylosis* of the roots of the *Teeth*, or, in some rare cases, of the roots of one *Tooth* to those next it;—but especially by the *Blood* which is observed by *Dentists* to issue from the *Cavity* of the *Teeth* in sawing them across, for the purpose of fixing other *Teeth*.

The *Nerves* of the *Teeth* are from the *Fifth Pair*, those of the *Teeth* of the *Upper Jaw* being from the *Second*, and those of the *Teeth* of the *Lower Jaw* from the *Third Branch* of that *Pair*.

In the *Upper Jaw*, the *Nerves* enter through various parts of the *Os Maxillare Superius*, Tab. LXXIXBB. Fig. 5. In the *Under Jaw*, the *Trunk* which furnishes the *Dental Nerves* is lodged in the *Inferior Maxillary Canal*. Tab. LXXIXBB. Fig. 4.

The *Nerves* which supply the *Teeth*, though small, can be observed to enter the *Foramina* at the points of the *Fangs*, and by properly preparing the *Teeth*, can be distinctly traced in their *Osseous Canals*. Tab. LXXIXBB. Fig. 5.

The *Absorbents* of the *Teeth* have not been seen, but their existence is proved,—by the *Absorption* of the *Fangs* of the *Temporary Teeth* during the second *Dentition*;—the removal of part of the *Teeth* in consequence of ulceration within them;—and the disappearing of part of the *Internal Substance* of the *Teeth* of such large *Animals* as the *Elephant*, where the *Tusks* have been found with extraneous *Bodies* forced into, and lodged within them.

The *Substance* of the *Osseous* part of the *Teeth* is like that of *Bone* in other parts of the *Body*, differing only in being harder and more dense, in having their *Fibres* generally in a longitudinal direction, and in having a partial *Covering* from the *Enamel*.

The *Teeth* are fixed in their *Sockets* by *Gomphosis*, and attached to the *Alveoli* by a strong *Periosteum*. This *Periosteum* lines the *Sockets*, and is reflected upon the *Fangs* as far as the *Neck* of the *Teeth*, where it is intimately connected with the *Gums*.

The *Teeth* serve to masticate the *Aliment*, to assist in pronouncing.

pronouncing several of the Letters, and are ornamental to the Face.

Analysis of the Teeth, as made by MR PERYS of London.—See MR Fox's *Natural History of the Human Teeth*.

100 parts of Enamel yielded,		
Phosphate of Lime,	-	78
Carbonate of Lime,	-	6
Water of composition and loss,		16
		<hr/>
		100

100 parts of the Osseous Substance yielded,		
Phosphate of Lime,	-	58
Carbonate of Lime,	-	4
Gelatine,	-	28
Water of composition and loss,		10
		<hr/>
		100

So far the Teeth agree in their general structure; but, in consequence of certain differences among them, they are in each Jaw divided into four classes, viz. *Four Incisores, Two Cuspidati, Four Bicuspidati, and Six Molares*.

The *Incisores*, or Cutting Teeth, Tab. XIV. are placed in the fore-part of the Jaw, and have their Bodies formed into Wedges sloped out behind. Viewed anteriorly, their cutting edges appear broader than the rest of the Tooth; when seen in a lateral direction, they appear thicker towards their roots. Their Fangs, when taken laterally, appear broader than when examined in their anterior and posterior Surfaces. Each of these Teeth has a single Fang.

Their Enamel is thicker on their anterior and posterior Surfaces than at the sides, where it is remarkably thin, and thicker before than on the back part of the Tooth.

The middle Incisores of the Upper Jaw are the broadest of the Incisores, while the lateral Incisores of the Under Jaw are larger than the middle ones. Tab. III.

The *Cuspidati*, or *Canine Teeth*, Tab. XIV. are placed at the sides of the Incisores, and, like them, have their Bases in form of *Wedges*, but *pointed* in the middle.

The Enamel covers more of these Teeth than of the Incisores, and is more equal in thickness all round the Teeth.

The Fangs are thicker, larger, and more depressed at the sides, than those of the Incisores, and appear broadest when viewed in a lateral direction.

The Fangs being the largest of any of the Teeth, project more in the Jaw, as is obvious both to the sight and

touch; hence the Incisores and Canini are almost in a straight line, especially in the Under Jaw. They have each commonly but one long root, though in some rare cases two, and are crooked at the point. They resemble the Tusks of Carnivorous Quadrupeds, especially those of the Dog tribe, from which they have got their name.

The two of the Upper Jaw are a little larger and longer, and have their roots more crooked than those of the under one.

In the Upper Jaw, they are placed immediately under the Orbital Plates, and are termed *Eye-Teeth*, from a supposed connection with the Eyes. The two below are placed almost as deep as the Base of the Bone, and are called *Angular Teeth*, from supporting the Angles of the Mouth.

The *Bicuspidati*, formerly termed *Small Molares*, or *First and Second Grinders*, Tab. XIV. Tab. VI. are situated behind the Cuspidati, and bear an intermediate resemblance between these and the Molares.

Viewed in the Jaws, they are somewhat like each other, and not unlike the Cuspidati. The Body of each has two points upon its grinding Surface, one external, the other internal; and those in the Upper Jaw are nearly upon a level. In the Under Jaw, the points project most on the outside of the Teeth.

The Enamel is nearly equal in thickness round the Body of the Tooth, but is thinner at the sides than on the Cuspidati.

The Fangs resemble two Fangs united, with a depression between them; sometimes, however, the Bicuspidati of the Upper Jaw have distinct roots.

The Bicuspidati of the under Jaw are smaller than those of the upper one, the points on their grinding Surfaces are not so distinct, and the Teeth themselves have a slight inclination inwards in the Jaws.

The *Molares*, formerly termed *Large Molares*, Tab. VI. Tab. XIV. are behind the Bicuspidati, are the largest of the Teeth, and have broad Bases with several points. The roots divaricate from each other, and have partitions of the Sockets between them, which assists in lessening the pressure on their points during Manducation. They have thinner Enamel than the other Teeth.

The first of the Molares of the Under Jaw has five, and each of the other has four points.

Each has two roots, one placed forwards, the other backwards, and these are flat and broad, their flat Surfaces facing anteriorly and posteriorly. Sometimes there are three roots.

In the Upper Jaw, the first Molaris has four, and each of the others only three points.

In the two anterior Molares of the Upper Jaw, there are generally three roots, of which two are on the outer side; the third is on the inner side, and placed obliquely, and is the largest and roundest of the three. Sometimes,

times, though rarely, there are four roots. Tab. XIV. Fig. 4. I.

The Molares above have a perpendicular direction in respect to the Jaw, those below have an inclination inwards, which should be attended to by Dentists in the extraction of the Teeth.

The backmost Molares are termed *Dentes Sapien-tiæ*, appearing later than the rest of the Teeth.

They are smaller than the other Molares, and have generally fewer roots; these are often quite indistinct, as if squeezed together; and frequently there is only a single Fang.

The *Dentes Sapien-tiæ* of the Under Jaw have frequently curved roots, and are sometimes placed so obliquely inwards, as scarcely to appear beyond the Gums.

The Incisores of the Upper Jaw being for the most part much broader than those of the under one, the other Teeth are thrown farther back than the corresponding Teeth of the Under Jaw; in consequence of which, in well-formed Teeth, when the Jaws are shut, the Teeth of the Upper Jaw are opposed to the interstices of the Teeth of the under one, and the third Molares of the Upper Jaw being smaller than those of the Under, allow the Teeth to close even at their posterior parts. Tab. IV. Tab. XIV.

By such a construction, the Teeth are properly adapted to the Manducation of the Food, and one Tooth being lost, its opponent remains useful by acting upon the parts of the Teeth immediately opposed to it.

OF THE TEMPORARY TEETH.

In a Fœtus of three or four Months after Conception, the Jaws are distinctly formed; but, in place of Sockets, there are Grooves running along the Jaws, with impressions within them, forming the origins of the future Alveoli. Tab. LXXIXBB. Fig. 7. 9.

The Grooves are narrow and Deep at the fore-part of the Jaws, and become wider and more shallow towards their posterior extremities.

In the bottom of the Groove of the Lower Jaw, the Inferior Maxillary Vessels and Nerves are placed, which have afterwards a canal peculiar to themselves.

Within the Alveolar Grooves, there are, at this time, Ridges which gradually extend from the bottom and inner sides, forming Arches, and the Cavities becoming deeper, their external Openings contract, till, at the time of birth, they are almost closed, Tab. LXXIXBB. Fig. 16. In consequence of this, considerable pressure can be made in the time of Suction, without injuring the tender Teeth they contain.

The Alveoli of the Molares are produced directly before the roots of the Coronoid Processes of the Under Jaw, and in the Bulges or Tubers of the Upper Jaw, and come forwards as the Jaws increase in length and size. Tab. LXXIXD. Fig. 12.

In a Fœtus of about four Months, small Pulpy Processes are found to proceed from the inner Surface of the

Gums, and to be lodged in the Alveolar Grooves of both Jaws. These are the Rudiments of the future Teeth. Tab. LXXIXBB. Fig. 8.

At this time they are of a Gelatinous or Pulpy nature, resembling in shape the Bodies of the Teeth which are to be formed in them; each contained in a Membranous Capsule proper to itself.

By degrees the Pulp becomes firmer, and extremely Vascular, and having increased to near the size of the Body of the Tooth, Bone is deposited upon its extreme points, by the Blood-vessels, the Pulp itself continuing to grow for some time after this. Tab. LXXIXBB. Fig. 13.

About the fifth or sixth Month, Bone begins to appear on that part of the Surface which is afterwards to form their cutting Edges and grinding Surfaces, and in as many points as there are eminences on the Pulp. Tab. LXXIXBB. Fig. 15.

The Ossification begins in the Incisores at three points, and in the other Teeth at points corresponding with the number of the future points of the Teeth.

The Osseous points gradually increase, unite, and form a Layer of Bone, which extends over the Surface of the Pulp to the Necks of the Teeth.

Between the eighth and ninth Month, Ossification is considerably advanced in all the Pulps, and,

In the full-grown Fœtus, the outer Shells of five Teeth in each side of each Jaw are found, which are termed *Temporary, Deciduous, Shedding, or Milk Teeth*. Tab. LXXIXBB. Fig. 20.

Of these there are in each side two *Incisores*, one *Cuspidatus*, and two *Molares*; besides, there is the Shell of the Anterior Permanent Molaris, but the whole of the Temporary Teeth are much smaller than the corresponding classes of Teeth in the Adult.

In the Upper Jaw, the points or eminences of the Shells correspond with the depressions in the Teeth of the Under Jaw.

After the outer Shell of a Tooth is formed, the Osseous Matter gradually penetrates the greater part of the Pulp, and, having completed the Body, it contracts, and forms the *Cervix* of the Tooth.

Having formed the Cervix, the Cavity of the Tooth is by degrees diminished, and in proportion as it is lessened, part of the Pulp is pushed out or elongated, and assumes the shape of the respective Fang. Upon this Pulp also Bone is deposited.

While the Fang is extending, the Socket is found to accommodate itself to it, by extending along with it till the Fang is completed.

Where there are two or more Fangs, the Osseous Fibres shoot across at the Cervix, and form the beginning of these, after which the Ossification of each Fang advances in the same manner as that of a Tooth with a single root.

At birth, the Capsules containing the Pulps of the Teeth can be separated into two Membranes, the external of which is of a Spongy, and somewhat Vascular nature,

nature, and adheres to the Gums, while the internal, smoother and firmer than the former, and extremely Vascular, adheres to the Pulp.

The Membranes of the Pulp derive their Vessels from the Vessels of the Gums, the Pulps receive theirs from the Vessels which enter the Foramina at the points of the Fangs.

The Membrane containing the Pulp is firmly attached to the inside of the Gum, and to the Basis of the Pulp, and has the same form with the Tooth it incloses. Tab. LXXIXBB. Fig. 12. 15.

The Vascularity of the Pulp is shewn by injection, as is also that of the Membrane by which it is covered; and this appearance is rendered still more evident by examining the growing Teeth of large Animals, as those of the Elephant.

That part of the Pulp has the most Vascular appearance which is covered with Bone, but the Osseous Shell is found to adhere so slightly to the Pulp, as to be readily separated from it without apparent laceration.

The Osseous Matter of a Tooth is formed in Strata, one Layer being added within another, till the Tooth is completed. Tab. LXXIXBB. Fig. 2.

After the Osseous Substance is formed, the Enamel is added, which increases in thickness, till within a little while of the time at which the Tooth begins to pass through the Gum.

The Enamel is secreted by the Capsule which contains the Pulp, soon after the Osseous shell has begun to be formed. It is always thickest where first deposited; of course, it is thicker upon the Body than upon the Cervix of the Tooth.

The Enamel is secreted in the form of a pure white earthy Substance, moistened with a Mucilage, and has much the appearance of crystallization.

The deposition of the Enamel continues nearly as long as the Teeth are contained in their Capsules. It is at first, and even for some time after birth, so soft, as to be little firmer than Chalk, being easily scraped by the Nail, but soon acquiring a flinty hardness and a striated appearance.

After the Bodies of the Teeth have attained their full size, no addition of Substance is made to the Enamel, the Membrane which produces it being destroyed previous to the appearance of the Teeth beyond the Gums. The Osseous part of the Teeth, on the contrary, continues to grow for a considerable time afterwards, one third of the length of the Fangs being added, after the Teeth have first appeared in the Mouth.

While the Teeth are extending in their Sockets, they press upon their Capsules, and occasion an absorption of them; the remains of the Capsules surround the Necks of the Teeth, and are gradually removed as the Tooth is completed.

ORIGIN OF THE PERMANENT TEETH.

The Permanent Incisores and Cuspidati succeed to the

Temporary Incisores and Cuspidati; they are similar in form to these, but much larger; but the Temporary Molares are succeeded by the Bicuspides, which are much smaller.

When the Rudiments of the Temporary Teeth are somewhat advanced, a *New Sac* is sent off at the under and inner part of the Sacs of the Temporary Teeth of the Upper Jaw, and at the upper and inner part of the corresponding Sacs of the Under Jaw, the new Sacs lying between those of the Temporary Teeth and the Internal Alveolar Plate, each being on the inner side of the Tooth it is to succeed, and connected to the Gum. See Dr Blacke's Theses, Edin. 1798. Tab. LXXIXC. Fig. 2. 3.

These Sacs are at first contained in the same Sockets with the Temporary Teeth, and are loosely connected with the Membranes of these.

By degrees, little Nitches are formed in the internal Alveolar Plate, and these gradually form a distinct Socket round each of the Sacs.

When the Temporary Teeth have advanced in their Sockets, the Sacs of the Permanent Teeth become elongated, but still remain attached to the Sacs and Gums at the Neck of the Temporary Teeth by means of Processes which pass through small Foramina at the inner edge of the Jaw. Tab. LXXIXC. Fig. 7. 8.

At the time of birth, Ossification has commenced upon the anterior Permanent Molaris, and there are small Membranous Sacs, containing a Pulp with the Rudiments of the other two Molares. Ossification commences upon their tips some time after, but always first in the Lower Jaw.

The second Permanent Molaris is formed from the first in the same manner as the other Permanent Teeth are formed from the Temporary Set. A small Sac is sent back, which is at first contained in the same Socket with the Pulp of the first Molaris; a new Socket is afterwards formed, in which the Pulp of the second Molaris becomes perfect; this, in a similar way, sends off another Process, in which the third Molaris is formed.

OF THE APPEARING OF THE TEMPORARY TEETH.

THE Temporary Teeth generally begin to appear between the sixth and eighth Month after birth, the corresponding Teeth commonly appearing about the same time, first in the Under, then in the Upper Jaw, though they frequently appear a little sooner, and often considerably later than this period.

They commonly appear in the following order: First, one of the Central Incisores of the Under Jaw, and soon after the other one; a few weeks afterwards, the Central Incisores of the Upper Jaw pass through; these are soon succeeded by the lateral Incisores of the Under Jaw, and then by those of the Upper Jaw.

About the sixteenth or eighteenth Month, the anterior or small Molares of the Under Jaw appear, and are succeeded by those of the Upper Jaw.

The

The Cuspidati come next in order, and first those of the Under Jaw, which are soon followed by those of the Upper Jaw.

About the end of the second year, or a little later, the second, or posterior, or large Molares, appear, which complete the first Set; though to the above rule there are many exceptions.

OF THE FORMATION OF THE PERMANENT TEETH.

THE anterior Permanent Molares are first formed, the Pulps being found in the Fœtus previous to its birth, and are situated in the back part of the Jaws.

The Permanent Incisores and Cuspidati are formed on the inner side of the Temporary Incisores and Cuspidati, in Capsules peculiar to themselves, but in the same Sockets with the Temporary Set.

The Bicuspидati are formed at the roots of the Temporary Molares, small Osseous Partitions being found between the two Sets.

At the time of birth, Ossification has commenced upon the anterior Permanent Molares; and there are small Membranous Sacs containing a Pulp, with the Rudiments of all the other Molares. Ossification commences upon their tips some time after, but always first in the Under Jaw.

By degrees, as the Alveoli increase in size, the Permanent Teeth get Sockets of their own, as is seen by removing the outer Alveolar Process in a Child about four years of age. Tab. LXXIXC. Fig. 2. 3. 9.

At this period, the Ossification of the Incisores, Cuspidatus, first Bicuspидatus, and first Molaris, in each side, is much advanced; the second Molaris is also partly formed, and soon after the Ossification of the second Bicuspидatus commences.

About six years of age, all the Permanent Teeth, except the Dentes Sapientiae, have made considerable progress. Twenty now are commonly seen without the Gums, which are to be succeeded by twenty-eight, that at this time lie concealed in the Jaws. Tab. LXXIXC. Fig. 10.

In the eighth or ninth year, the Dentes Sapientiae begin to be formed.

OF THE SHEDDING OF THE TEMPORARY, AND THE APPEARING OF THE PERMANENT TEETH.

ABOUT seven years of age is the common time at which Children begin to shed their Teeth, though some shed their Teeth a little sooner, others considerably later than this period; and it not unfrequently happens, that some of the first Set remain in the Jaws to adult, or even old age.

The anterior Permanent Molares first appear soon after the Temporary Central Incisores of the Under Jaw are removed, and are succeeded by the Permanent Central

Incisores, one coming a little while before the other; then the Central Incisores of the Upper Jaw come out, and the Permanent Central Incisores succeed them.

Next the Lateral Incisores are succeeded by the Permanent ones.

Then the first or anterior Temporary Molares come out, and are succeeded by the anterior Bicuspides.

Then the second Temporary Molares and Cuspidati are succeeded by the posterior Bicuspидati and the Permanent Cuspidati; the whole shedding of the Teeth occupying a space of five or six years.

The Dentes Sapientiae do not appear till between the eighteenth and twenty-first year; sometimes, however, they appear a year or two sooner, and frequently not till some years later.

The number of the Teeth does not increase till between the sixth and eighth year, when the Teeth that first made their appearance through the Gums are shed, and replaced by others, and more soon begin to appear farther back in the Jaws.

The second Set of Teeth, it is found, contrary to the opinion of former times, do not push out the first, the second Set being formed in Sockets of their own, and the Fangs of the first Set gradually decaying as the succeeding Teeth grow. The decaying of the Fangs of the first Set being in proportion to the decay of the first Set of Sockets.

The Permanent Teeth arise in Sockets appropriated to themselves, are inclosed in these Sockets after the Temporary Teeth have been shed.

During the growth of the Permanent Teeth, absorption proceeds in the Fangs of the Temporary Set, which facilitates their removal from the Sockets, and affords a passage for the Permanent Teeth.

While the Permanent Teeth increase in size, they occupy more space, come forwards, produce a pressure against the Bony Partitions placed between them and the Temporary Teeth, and then against the posterior Surface of the roots of these Teeth, till at length the greater portion, or the whole of the parts pressed against, are absorbed.

The Permanent Teeth now come forwards under the Temporary Set, which, by the pressure being continued, soon drop out.

Besides the causes mentioned above, with respect to the shedding of the Teeth, others contribute; for now and then the Temporary Teeth drop out long before the Permanent Teeth appear, and sometimes where they never appear.

That absorption of the first Set is much influenced, however, by pressure on the second Set, is rendered probable from the instances where one or more of the Temporary Teeth have been observed remaining in the Jaws for many years, and where, upon examination, no Permanent Teeth have been found to be formed.

OF THE GROWTH OF THE JAWS.

AFTER all the Temporary Teeth have appeared through the Gums, the Jaws are observed to grow little in the parts the Teeth occupy.

The Lower Jaw receives its greater increase between the second Temporary Molaris and the Coronoid Process, the lengthened part being destined for the Permanent Molares. Tab. LXXIXD. Fig. 10.

The Temporary Incisores and Cuspidati being much smaller than the Permanent, while the Temporary Molares are larger than the Bicuspидati which succeed them, space is gained for the Front Teeth, which otherwise would be distorted in the Jaws.

The Jaws grow uniformly throughout for about a year after birth, and as far as the Teeth extend form nearly half of a circle; after all the Temporary Teeth have appeared, the Jaws elongate, so that in the Adult they form half of a long Ellipsis.

The extension which takes place between the last Temporary Molaris and the Coronoid Process, and in the corresponding parts of the Upper Jaw, continues to increase till the eighteenth or twentieth year, the anterior part of the Jaw adapting itself to the Permanent Teeth, but scarcely receiving any additional size.

TABLE

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

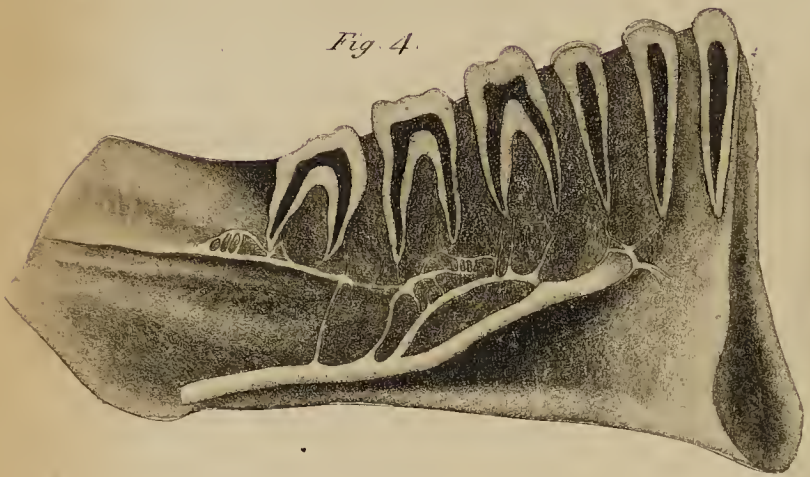


Fig. 5.

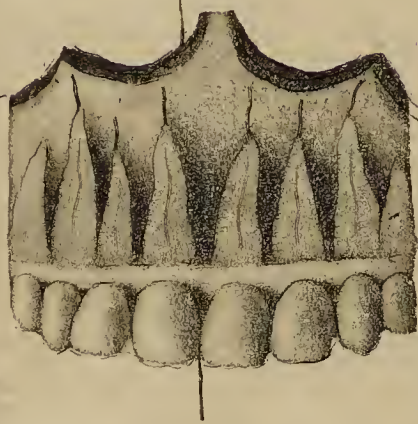


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.

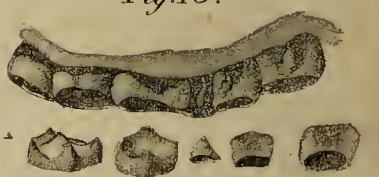


Fig. 16.



Fig. 17.



Fig. 18.

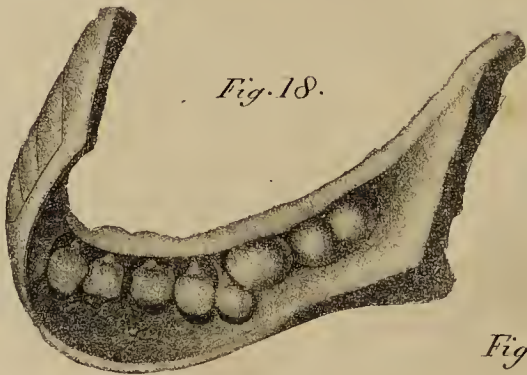


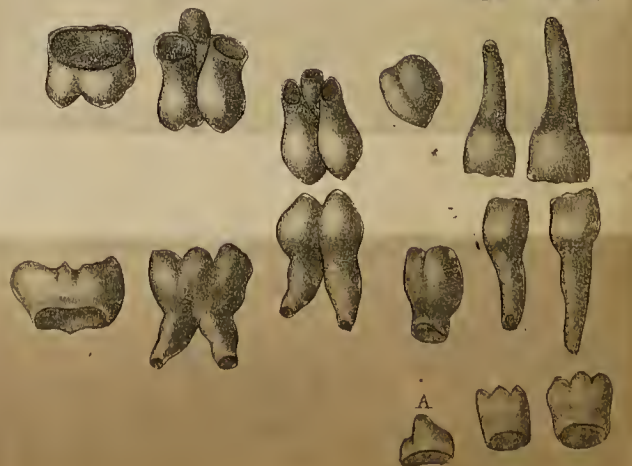
Fig. 19.



Fig. 22.



Fig. 20.



T A B L E LXXIXBB.

The STRUCTURE of the TEETH in the ADULT ; their Origin in the Fœtus, and Progress in the CHILD.

FIG. 1.

Longitudinal Sections of the Teeth, in which the Distribution of the Enamel is distinctly seen ; particularly in the first of the Row, where the Osseous Part is affected by the Tooth having been exposed to the action of Fire.

FIG. 2.

Other Examples of Sections of Teeth, to shew the Structure of the Enamel, and of the Osseous Part.

FIG. 3.

A Section of the Under Jaw of a Child of fifteen Months, to shew the Course of the Alveolar Artery. In this Section are seen also the anterior Temporary Molaris, the Socket of the posterior Temporary Molaris, and the anterior Permanent Molaris.

FIG. 4.

A Section of the Inner Side of the Left Half of the Lower Jaw, with the Trunk of the inferior Maxillary Nerve, which is a little displaced, to shew the Nerves which enter the Cavities of the Teeth.

FIG. 5.

A Section of the Fore-part of the Upper Jaw, with the Teeth. The Fangs are cut longitudinally, to shew the Nerves in the Osseous Canals.

FIG. 6.

An Artery entering a Tooth, magnified.

FIG. 7.

Half of the Lower Jaw of a Fœtus of three or four Months. In the Anterior Part of the Jaw, Processes of Bone are shooting across to form the Alveoli for the Temporary Incisores.

FIG. 8.

The Gums removed from the Preparation in Fig. 7. to shew the first appearance of the Pulps, of which the Incisores are the most distinct.

FIG. 9.

The Alveolar Processes represented in the Left Half of the Upper Jaw of a Fœtus of three or four Months.

FIG. 10.

The Pulps contained in the Alveolar Processes of the Left Half of the Upper Jaw of a Fœtus of the same age as in Fig. 9.

FIG. 11.

The Left Half of the Under Jaw of a Fœtus of six Months, in which the Alveolar Processes are more advanced.

FIG. 12.

The Pulps, with the Membranes inclosing them, removed from the same Jaw.

FIG. 13.

The Gums, with the Rudiments of the Teeth in their Membranes, removed from the Half of Lower Jaw, in a Fœtus of about four Months. Of the Teeth, the Incisores, Cuspidatus, Molares, and anterior Permanent Molaris, are seen. The small Figures below shew the Shells removed from the Membranes of the Incisores, Cuspidatus, and two Molares.

FIG. 14.

Half of the Under Jaw of a Fœtus of five Months, with the Inner Alveolar Plate removed ; shewing the Membranes of the Incisores, Cuspidatus, and Molares, with the Membrane of the anterior Permanent Molaris and Blood-vessels.

FIG. 15.

An Internal View of the Gums, with the Rudiments of the Teeth in their Membranes, in one Side of the Upper Jaw, in a Fœtus of eight Months; shewing the Incisores, Cuspidatus, two Molares, and the anterior Permanent Molaris. The Figures below shew the shells of these Teeth removed from their Membranes.

FIG. 16.

A View from below, of the Upper Jaw of a Fœtus of nine Months; shewing the Alveoli of the Deciduous Teeth, and the Sockets of the Permanent Teeth beginning to form.

a, a, The ossa maxillaria superiora;

b, b, Their nasal processes.

c, c, The ossa palati.

d, d, e, f, g, The alveoli of the temporary teeth, and the same are seen in the opposite side of the jaw.

In g, the membrane of the anterior permanent molaris was also contained.

The small perforations behind the alveoli of the anterior deciduous teeth are the origins of the alveoli of the permanent incisores and cuspidati.

FIG. 17.

Half of the Lower Jaw of a Fœtus of seven or eight Months, seen from the outside, the External Plate being cut to shew the Nerves entering the Pulps of the Teeth. The Parts are contracted by their having been kept in Spirit of Turpentine. The Figure shews the Central Incisores almost through the Gum, the Lateral Incisor, the Cuspidatus, the two Molares, and the anterior Permanent Molaris. The Nerve is seen in the Maxillary Canal, sending Branches to the Teeth.

FIG. 18.

The Inner Side of the Jaw represented in Fig. 17. Part of the Alveolar Process being cut, the Figure shews the Pulps, the Sacs, and connecting Processes of the Permanent Incisores, Right Cuspidatus, and two Deciduous Molares, from the anterior of which a small Process, the beginning of the Anterior Bicuspidis, is sent off.

FIG. 19.

The Fore-part of the same Jaw seen from the Inner Side, in which the Sacs of the Anterior Permanent Incisor and the Cuspidatus appear, the former towards the left, and the latter towards the right-hand side. Between these the Sac, with the Lateral Incisor, is raised and inverted, by which the Sac of the Lateral Deciduous Incisor is exposed.

FIG. 20. 21. 22. of this, and FIG. 1. of next Table, represent the Progress of Ossification of the Teeth, from the ninth Month of the Fœtus till between the second and third Year of the Child. The Teeth are represented as taken out from the Sockets of one side of the Jaw, but so placed, that the back Ground in some measure points out their depth with respect to the Jaws and Gums.

FIG. 20.

The Teeth at the time of Birth, when the Parts of them Ossified, are only Shells, having the form of the Crowns of the Teeth.

A, The deciduous teeth.

B, The rudiments of the permanent incisores.

C, The rudiments of the anterior permanent molares.

FIG. 21.

The Teeth of a Child six or eight Months old. Now the Central Incisores of the Upper Jaw, and the Central and Lateral Incisores of the Lower Jaw, have made their appearance.

A, The deciduous teeth.

B, B, The permanent incisores.

C, The cuspidatus of the lower jaw.

D, The two permanent molares.

FIG. 22.

The Teeth of a Child sixteen Months old. The Incisores and first Molaris in each Jaw have appeared beyond the Gums.

A, A, The permanent cuspidati.

Fig. 1.

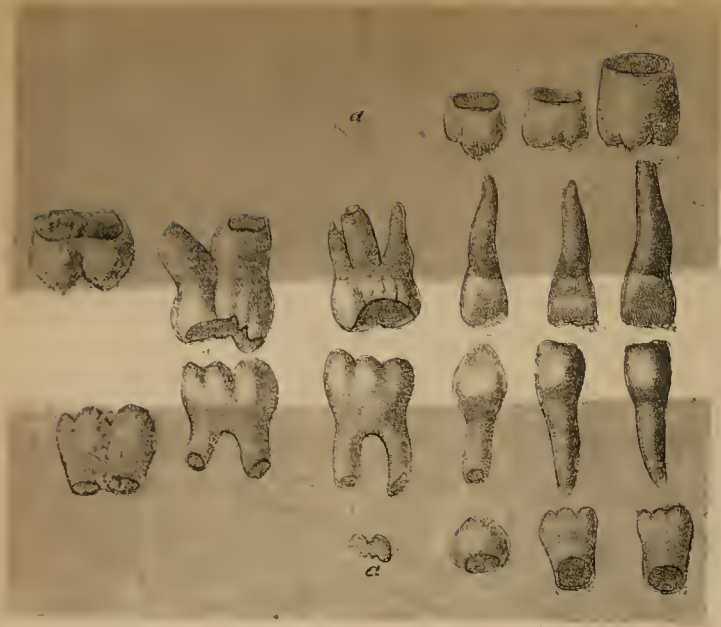


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 9.

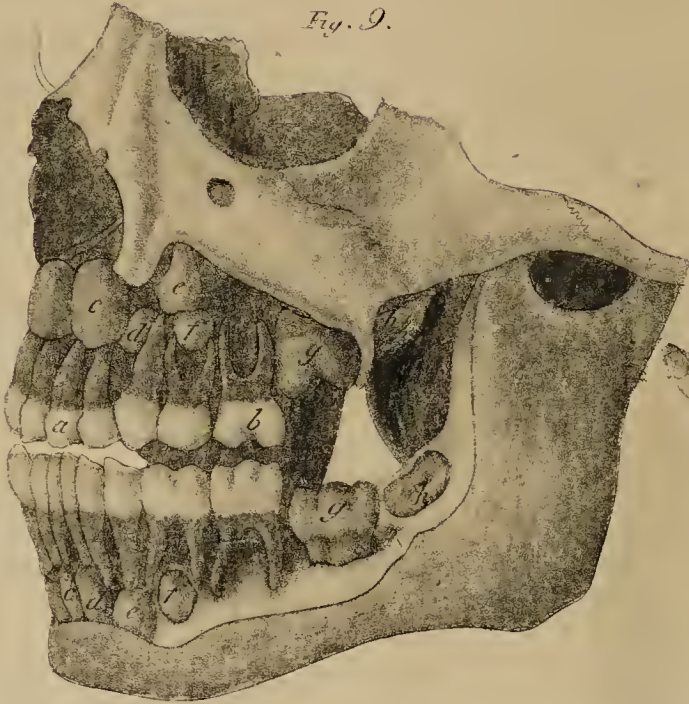


Fig. 7.

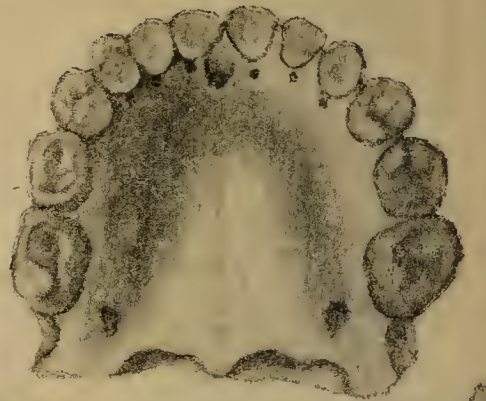


Fig. 8.

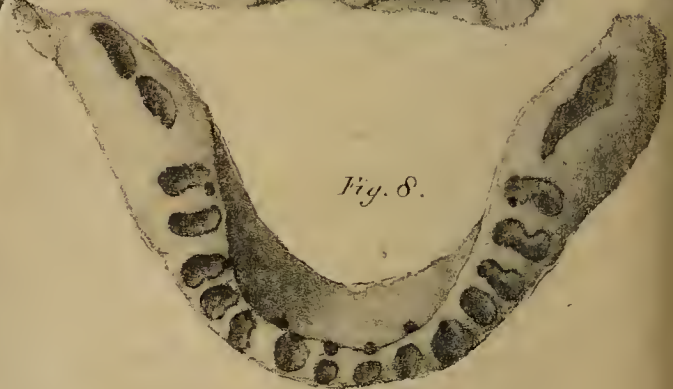


Fig. 10.



Fig. 11.



T A B L E LXXIXC.

Exhibits the DISPOSITION of the First and Second SETS of TEETH, in Children from two to nine Years of Age.

FIG. 1.

The Teeth of a Child between two and three Years of Age. The whole of the Temporary Set have got through the Gums; and, in addition to the Permanent Teeth seen in the three last Figures of the former Table, are,

A, A, The points of the first bicuspidæ.

FIG. 2. and 3.

From a Child about four Years of Age.

FIG. 2.

An Inner View of the Left Half of the Upper Jaw, with the Teeth. The Alveolar Processes, and part of the Septum Palati, are cut.

a, b, The temporary teeth.

c,—f, The rudiments of the permanent teeth inclosed in their capsules, and attached by processes to the membranes and gums of the temporary teeth.—c, The central, and, d, the lateral incisor; e, e, the bicuspidæ; f, the cuspidatus deep in the jaw, yet connected to the temporary cuspidatus; g, the gum over the anterior and central molares, not yet cut.

h, The septum palati.

i, The pterygoid process.

k, The posterior naris.

FIG. 3.

The Right Half of the Lower Jaw, with the Teeth, viewed from the Inner Side, the Internal Table being cut off.

a, b, The temporary teeth.

c,—i, The membranes inclosing the permanent teeth, with their processes connecting them to the gums, and to the membranes of the deciduous teeth.—c, The central incisor; d, the lateral incisor; e, the cuspidatus; f, f, the bicuspidæ; g, the anterior, and, h, the middle molaris; i, the part where the dens sapientiæ is afterwards to be formed.

k, The inferior maxillary trunk of vessels, nerves, and periosteum, sending branches to the teeth, the remains passing out by the anterior maxillary foramen, to be dispersed upon the under lip.

FIG. 4.

The Deciduous Cuspidatus of a Child of about eighteen Months, inclosed in its Membrane, and the Capsule of a Permanent Tooth firmly connected to it.

a, The capsule of the deciduous tooth.

b, That of the permanent tooth, with its attachment to the other. The shell which was formed in it is removed.

FIG. 5.

The Connection between a Deciduous and a Permanent Incisor.

a, The deciduous incisor.

b, The sac of the permanent incisor.

c, The process by which they are connected.

FIG. 6.

A Section of the Lower Jaw of a Child about four Years old, representing a Temporary and a Permanent Tooth in different Alveoli.

a, The body of a temporary incisor;

b, Its fang.

c, A process descending from the gum through a foramen to,

d, The capsule of a permanent tooth.

e, The gum inverted to shew this connection.

FIG. 7.

An Under View of the Upper Jaw of a Child, to shew the Foramina through which the Processes passed, which made the Connection between the Temporary and Permanent Teeth. In the Figure are seen all the Temporary Teeth, and the Anterior Permanent Molares. Behind the Incisores

Incisores and Cuspidati, the Foramina appear, with the Canalis Incisivus between them.

FIG. 8.

A View of the Upper and Inner Side of the Lower Jaw of a Child, with the Teeth removed, to shew the Foramina for the connecting Membranes of the two Sets of Teeth. Of these Foramina, five are seen on the edge of the Alveolar Plate, at the Inner Side of the Alveoli in each side of the Jaw.

FIG. 9. 10. 11.

The Jaws and Teeth of Children at different ages. The Jaws are cut to shew the Teeth, the white unshaded part of which is considered to have passed through the Gums, and to be appearing in the Mouth.

FIG. 9.

A View from the Left Side, of the Disposition of the Teeth of a Child between four and five Years of Age.

a, b, a, b, The temporary set of teeth, consisting of the two incisores, the cuspidatus, and the two molares in each jaw.

c,—b, The permanent teeth.—c, The central, and, d, the lateral incisor; e, the cuspidatus; f, the first bicuspis, the formation of the second not yet having commenced; g, the first, and, h, the second molaris.

FIG. 10.

In the Right Side of the Head, a View of the two Sets of Teeth in a Child of six Years of Age.

a, b, The temporary set of teeth.

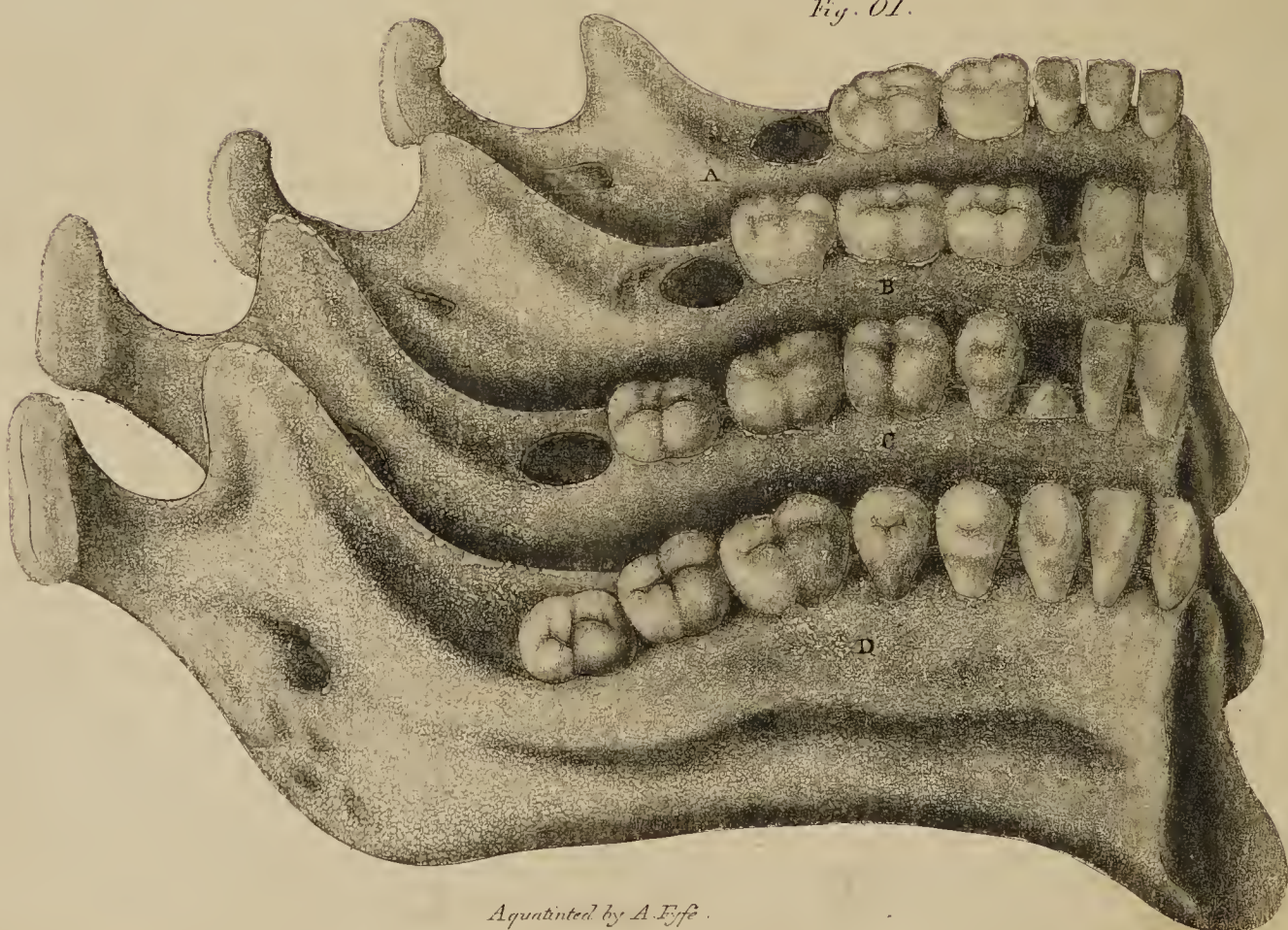
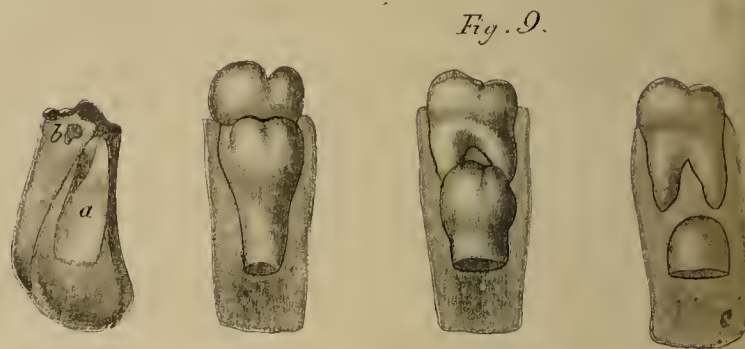
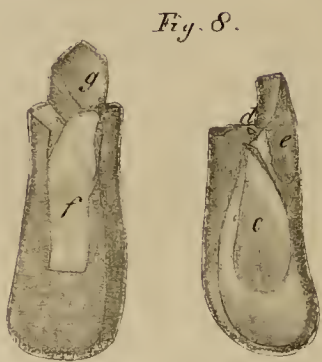
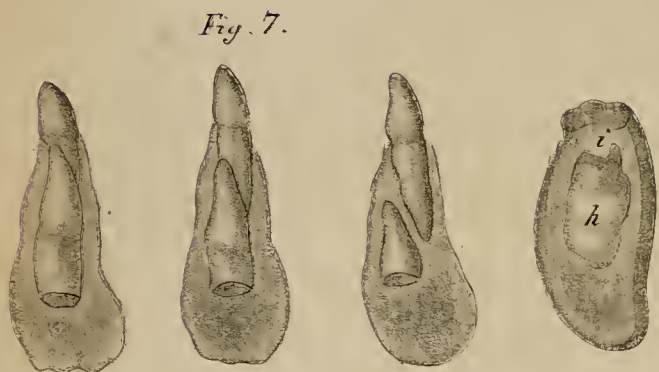
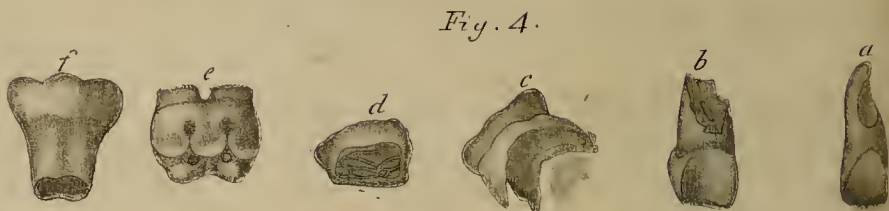
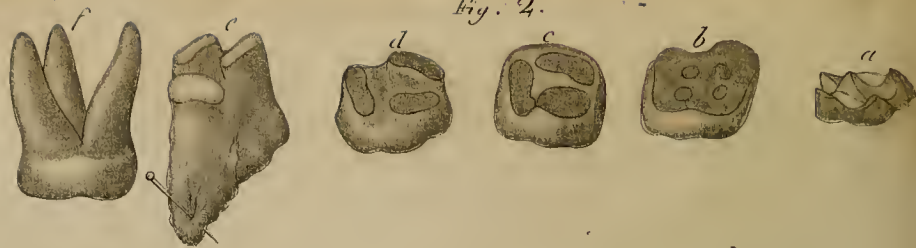
c,—b, The permanent set.—c, The central, and, d, the lateral incisor; e, the cuspidatus; f, f, the two bicuspidates; g, the first, and, h, the second molaris.

FIG. 11.

A View of the Teeth, from the Left Side, in a Child of eight or nine Years of Age. The Temporary Incisores have been shed, and replaced by the Permanent Set, and the first Permanent Molares have appeared.

a, b, b, The remaining temporary teeth.—a, The cuspidatus, and, b, b, The molares.

c,—i, The permanent teeth.—c, The central, and, d, the lateral incisor; e, the cuspidatus; f, f, the bicuspidates; g, the first, and, h, the second molaris; i, the commencement of the third molaris, or dens sapientiae.



T A B L E LXXIXD.

Shews the Increment of the TEETH, the Absorption of the FANGS of the TEMPORARY SET, and the Disposition of the TEETH in the JAWS at different Periods.

FIG. 1.

Represents a Series of the Increment of an Anterior Permanent Molaris of the Under Jaw, from the commencement of Ossification to the perfect State.

- a*, Five points of ossification; *b*, the shells conjoined; *c*, the fangs beginning to form; *d*, the fangs more perfect.
- e*, The pulp advancing more rapidly than the ossification.
- f*, The roots almost complete; *g*, a fang with two cavities, a rare occurrence; the other fang has a single cavity.

FIG. 2.

A Series of the Increment of an Anterior Permanent Molaris of the Upper Jaw.

- a*, Five points of ossification not yet perfectly conjoined; *b*, the shells united; *c*, the incipient roots; *d*, the roots more perfect; *e*, the pulp advancing faster than the osseous part of the fangs. The pin is stuck into the membrane of the tooth which is drawn over the enamel.
- f*, A perfect tooth, with an opening in the point of each fang.

FIG. 3.

The same Series of Increment in a Bicuspis.

- e*, A bicuspis of the lower jaw with a single fang.
- f*, The same in the upper jaw with two fangs, as not unfrequently happens.

FIG. 4.

Different Deciduous Teeth, whose Fangs are wasted by Absorption.

- e*, A tooth in which the enamel is imperfectly formed, there being several grooves and pits in it.

- f*, A tooth where the pulp is not divided, of course there is only a single root.

FIG. 5.

Several Specimens of Temporary Cuspidati, to shew the progress of Absorption.

FIG. 6.

The same thing seen in the Temporary Molares.

FIG. 7.

Sections of the Lower Jaw, representing the Progress in the Formation of the Permanent Teeth, and the Absorption of the Fangs of the Temporary Teeth.

FIG. 8.

A Section of Jaws, representing the Permanent Teeth partly in their own Sockets, and partly in those of the Temporary Teeth.

- a*, A permanent incisor passing into the socket of a temporary tooth which is shed; *b*, a foramen through which the membranes of the two teeth were connected.
- c*, A permanent incisor appearing through the inner part of the jaw, and more internal than the foramen; *d*, where the membranes were connected; *e*, a central deciduous incisor retaining its root.
- f*, A permanent incisor which has appeared in the inner side of the mouth, on account of the resistance of, *g*, a temporary cuspidatus.
- h*, One of the permanent bicuspidates passing into the socket of a deciduous molaris, which had been extracted; *i*, the osseous septum not yet absorbed; *k*, the socket of one of the molares.

FIG. 9.

Other Examples of Sections of the Lower Jaw, shewing the

the progress in the Formation of the Permanent Teeth, and the Absorption of the Fangs of the Temporary Teeth.

FIG. 10.

Represents the Left Half of four Lower Jaws, viewed from the Inner Side, shewing the Disposition of the Teeth at different Periods, the change of the Temporary Teeth for the Permanent, and the addition of the Permanent Molares; that the Permanent Incisores and Cuspidati are larger than the Temporary Incisores and Cuspidati, while the Bicuspides are smaller than the Temporary Molares, which they succeed; and that the Extension of the Jaw is chiefly formed between the last Temporary Molares and the Coronoid Process.

A, From a child at six years of age, when only the temporary teeth have passed through the gums.

B, From a child of eight or nine years of age. The temporary incisores and cuspidatus have been shed; the permanent incisores, and the first permanent molaris, have grown up.

C, The first temporary molaris has been shed, and is succeeded by the first bicuspis; the cuspidatus and the second permanent molaris are appearing.

D, Shews the appearance in the adult state. The second temporary molaris is shed, and its place supplied by the second bicuspis. The third molaris, or dens sapientiæ, has appeared.

OF THE THROAT.

The *Throat* consists of the *Arches of the Palate*, of the *Pharynx* and *Larynx*, with the *Muscles*, *Vessels*, *Nerves*, &c. which surround them.

The *Arches of the Palate* are two in number in each side of the Throat, one of which is termed the *Anterior*, the other the *Posterior Arch*.

They are formed of a Doubling of the Skin, with a few scattered Muscular Fibres.

The *Anterior Arch* arises from the middle of the *Velum Palati*, at the side of the *Uvula*, and is fixed to the edge of the Base of the Tongue. Tab. XLVII. Fig. 15. b. Tab. LXVIII. No. 52.

The *Posterior Arch* has its origin likewise from the side of the *Uvula*, and passes downwards, to be inserted into the side of the *Pharynx*. Tab. XLVII. Fig. 15. a. Fig. 10. f. Tab. LXVIII. No. 53.

The *Anterior Arch* contains the *Circumflexus Palati*, and, with its fellow on the opposite side, forms the Opening into the Throat, called *Isthmus Faucium*.

The *Posterior Arch* has within it the *Levator Palati*.

Between the *Anterior* and *Posterior Arches*, and close by the sides of the Base of the Tongue, the *Amygdalæ*, *Tonsils*, or *Almonds* of the Ears, are situated. Tab. LXVIII. No. 54. Tab. XLIX. Fig. 5. g. Tab. XLVII. Fig. 10.—13.

They are of a reddish colour, of the figure of *Almonds*, full of Cells which communicate with each other, and have large irregular Openings, which convey *Mucus* into the Throat; the discharge of which is promoted by the motion of the surrounding parts.

PHARYNX.

The *Pharynx*, so called from its conveying Food to the Stomach, and Air to the Lungs, is a large Muscular Bag, in form of an irregular Funnel, with the Tube termed *Esophagus* descending from it, and forming the under end of that Funnel. Tab. XLVII. 6.—9.

It is bounded above by the Cuneiform Process of the Occipital Bone, the Pterygoid Processes of the Sphenoid Bone, and back-part of the Jaws; with all of which it is intimately connected.

The anterior margins of its Fleishy parts are connected to the edges of the *Larynx*, and its sides are covered by the great Blood-vessels of the Neck. Tab. XLIX. Fig. 6.

The fore-part of the *Pharynx* is formed by a Membrane common to it and to the back-part of the *Larynx*.

Behind, it lies flat upon the Cervical Vertebrae, and upon the Muscles which cover the fore-parts of the sides of these Vertebrae. Tab. LXVIII. No. 42.—48.

It has several *Openings* by which it communicates with the neighbouring Cavities.

Two of these lead upwards and forwards by the posterior Nares into the Nose, Tab. LXVI. G. Tab. LXVIII.

No. 43. Two go laterally by the Eustachian Tubes to

the Ears, Tab. LXVIII. No. 46.; one passes forwards through the large Opening, termed *Fauces*, or Top of the Throat, to the Mouth, Tab. LXVIII. No. 52.; one goes downwards and forwards through the *Larynx* and *Trachea*, to the Lungs; Tab. XLVII. Fig. 10. l; and another directly downwards by the *Esophagus* to the Stomach. Tab. LXVIII. No. 42.

The *Pharynx* is surrounded by a loose Cellular Substance, and consists of different Layers of Muscles, called *Constrictores Pharyngis*, which have been already described.

On the inner side, it is lined by the continuation of the Membrane of the Mouth, which is perforated by the Ducts of numerous Glands, for the secretion of *Mucus*.

The lower end of the *Pharynx*, opposite to the under edge of the *Cricoid Cartilage*, describes a complete Circle, which forms the beginning of the *Esophagus*.

The *Pharynx* is supplied with Blood by the *Pharyngeal Branches*, which come directly or indirectly from the *External Carotids*.—It returns its Blood to both *Jugular Veins*.—Its Nerves are from the Eighth Pair.

The *Pharynx* receives the Aliments from the Mouth, and, by the action of its Muscles, conveys them to the *Esophagus*. It must likewise assist in the modification of the Voice.

LARYNX.

The *Larynx*, so called from its being the Principal Organ of Voice, is situated at the upper and fore part of the Neck, immediately under the *Os Hyoides*, which is placed at the root of the Tongue. Tab. XLIX. Fig. 5.

It is composed of Cartilages, Muscles, Ligaments, Membranes, and Mucous Glands; and is connected above to the Tongue and *Os Hyoides*, Tab. LXXX. Fig. 8. and behind to the *Pharynx*. Tab. XLIX. Fig. 5. 6.

The *Cartilages* of the *Larynx* are generally considered as being Five in number, though, besides these, some choose to enumerate small Projections which are connected with them.

The *Five Cartilages* are,—the *Thyroid*, the *Cricoid*, the *Two Arytenoid*, and the *Epiglottis*.

The *Thyroid*, *Scutiform*, or *Shield-like Cartilage*, is placed at the upper and fore part of the *Larynx*, and is the largest of the whole. Tab. LXXX. Fig. 3. g. Tab. XXXI. Fig. 1. i, k.

When spread out, it is of an oblong shape, Tab. LXXX. Fig. 6. a, a; but, in the natural situation, it consists of two lateral Wings or Portions, of a quadrangular form, uniting before in a longitudinal Angle, which can be readily felt in the fore-part of the Throat, and which, from its projecting more in Men than in Women, has obtained the name of *Pomum Adami*. Tab. LXXX. Fig. 3. g.

The upper part of the Angle is formed into a Notch, from which, and from the upper edge of the Cartilage

in general, a *broad Ligament* ascends, to fix it to the under part of the Os Hyoides. Tab. LXXX. Fig. 3. *e*.

From the posterior corners, four Processes project, called *Cornua*, two of which, termed *Superior*, are long, and ascend to be joined by round Ligaments to the extremities of the Cornua of the Os Hyoides. Tab. XLIX. Fig. 7. Tab. 80. Fig. 3. *f, f*.

In the middle of these Ligaments, one or two small Cartilaginous, or even Osseous Substances, of an oval form, are frequently found. Tab. LXXX. Fig. 7. *k, k*.

The other two Cornua, called *Inferior*, are shorter than the Superior, and curved backwards, to be fixed by smooth articulating surfaces to the sides of the Cricoid Cartilage. Tab. LXXX. Fig. 3. *i, i*. Fig. 6. *b, b*.

The Thyroid Cartilage serves for the protection of the other Cartilages, and, along with the Os Hyoides, preserves the Passage open, for the transmission of Food to the Stomach.

In old age, this Cartilage is frequently ossified.

The *Cricoid*, *Annular*, or *Ring-like Cartilage*, is placed below, and also behind the Thyroid, and, like it, may be readily felt in the fore-part of the Throat. Tab. LXXX. Fig. 3. *k*. Fig. 4. *g*. Tab. XXXI. Fig. 1. *p*.

It is narrow before, where it lies under the Thyroid Cartilage, and thick, broad, and strong posteriorly, where it is placed behind that Cartilage. Tab. LXXX. Fig. 6. *f, g*.

Its Posterior Surface is divided by a *Ridge* into two lateral Cavities, for the reception of the posterior Crico-arytenoid Muscles. Tab. LXXX. Fig. 4. *b, b*.

Its under edge is horizontal, and fixed to the whole circumference of the beginning of the Trachea. Tab. LXXX. Fig. 6.

The upper Edge slants considerably, and has its anterior narrow part fixed to the under edge of the Thyroid Cartilage. Tab. LXXX. Fig. 3. *6*.

It has four small Articular Surfaces, with distinct Capsular Ligaments, of which two are placed above, for the articulation of the Arytenoid Cartilages, and two at the under and lateral parts, for the connection of the inferior Cornua of the Thyroid Cartilage. Tab. LXXX. Fig. 6. *i, b*.

The Cricoid Cartilage forms part of the general Tube of the Trachea, constitutes the Base of the Larynx, and gives a firm support to the Arytenoid Cartilages.

The two *Arytenoid Cartilages* are much smaller than the other Cartilages, and are placed upon the upper, posterior, and lateral parts of the Cricoid Cartilage, at a small distance from each other. Tab. LXXX. Fig. 7. *e, e*. Tab. XXXI. Fig. 2. *G, G*.

They are of a *triangular* form, and a little twisted, and are bent back, so as to have a broad concave surface behind. Tab. LXXX. Fig. 6. *k, l*.

Their upper extremities, or Cornua, are turned towards each other. They are now and then found loose in the form of Appendices, and are considered by some Authors as distinct Cartilages.

Their Bases are *broad* and *hollow*, where they are articulated by Capsular Ligaments with the Cricoid Cartilage, upon which they are moved in different directions, by the action of various Muscles. Tab. LXXX. Fig. 4. *i, i*.

They are connected to each other, and to the adjacent Cartilages, by different Muscles and Ligaments. Tab. LXXX. Fig. 4. *6, 7*.

The Arytenoid Cartilages form a part of the Opening called *Glottis*, and give attachment to its Ligaments.

The *Epiglottis*, obtaining its name from its situation above the Glottis, is of an Oval form when surrounded by its Ligaments and Membranes; but when divested of these it is found to be narrow below, broad above, and rounded at its upper extremity. Tab. LXXX. Fig. 7. *a*. Fig. 4. *d*.

It is convex towards the Tongue, and concave towards the Glottis, with its point reflected a little forwards.

It is placed behind the upper part of the Thyroid Cartilage, is situated obliquely over the Glottis, and may be seen and examined in the living Body, by pressing down the root of the Tongue.

Its under end is fixed by a broad and short Ligament to the middle Notch of the Thyroid Cartilage, and by two lateral Ligaments to the whole length of the Arytenoid Cartilages. Tab. LXXX. Fig. 4.—7. *9*.

It is fixed to the roots of the Os Hyoides and Tongue by another Ligament, which is a doubling of the inner Membrane running along the middle of its anterior Surface, and forming the *Frænum Epiglottidis*. Tab. LXXX. Fig. 3. *d*. Fig. 8. *c*.

It is very elastic, and is much more pliable than the other Cartilages, being of a Cartilago-ligamentous nature.

It is found to have a number of *Fissures*, in which *Lacuna* are placed, and to be perforated by numerous *Foramina*, which are the Mouths of so many Mucous Follicles, and which are in a great measure concealed by the Membrane which covers it. Tab. LXXX. Fig. 7.

It breaks the current of the Air coming from the Mouth and Nose, and prevents it from rushing too forcibly into the Cavity of the Lungs. Pressed and drawn down by the Tongue and by small Muscles, it defends the Glottis, and shuts it completely in the time of Swallowing. After the Action of Swallowing, it is raised by its own elasticity, and by the root of the Tongue, to which it is fixed; returning to its former position.

Ligaments of the Glottis.—From the fore-part of the Body of each of the Arytenoid Cartilages, a *Ligamentous Cord* passes horizontally forwards, to be fixed by its other extremity to the inside of the anterior Angle of the Thyroid Cartilage. Tab. LXXX. Fig. 4. *k, k*. Fig. 5. *e, e*. Fig. 6. *m, m*.

The Opening formed between these Ligaments is called *Glottis*, *Mouth of the Larynx*, and *Rima Glottidis*, and is of a triangular figure, the Ligaments being in contact

contact before, but at a considerable distance from each other at their posterior Extremities.

Under these two Ligaments there are two others, larger and more distinct than the former, and which are commonly considered as the *proper Ligaments of the Glottis*. They arise from the Base of the Arytenoid Cartilages, and run in the same direction with the former, to be fixed also to the Thyroid Cartilage. Tab. LXXX. Fig. 4. *l, l.* Fig. 5. *f, f.* Fig. 6. *n, n.*

In the Interstice of the Superior and Inferior Ligaments, on each side there is a *Fissure*, which leads to a small Membranous Cavity or Depression, with its bottom turned outwards. Tab. LXXX. Fig. 4. *m, m.* Fig. 5. *g, g.*

These are the *Ventricles of the Larynx* of GALEN.—They are chiefly formed by the inner Membrane of the Larynx.

They differ in size in different People, have Mucous Follicles opening into them, and are found to be serviceable in the modulation of the Voice.

On the anterior Surface of the Arytenoid Cartilages, there is a small Depression, filled by a *Glandular Body*, which not only covers the fore-part of these Cartilages, but is continued over the posterior extremity of the Ligaments of the Glottis. Tab. LXXX. Fig. 5. *d, d.*

The *Arytenoid Glands* are larger in some Subjects than in others. They were discovered, and are particularly described and delineated, by MORGAGNI.

The Ligaments which connect the Epiglottis to the Notch of the Thyroid Cartilage, and to the under side of the Os Hyoides, together with one which ties the Base of the Os Hyoides, form a *Triangular Space*, which is also occupied by Cellular Substance and by Mucous Glands. Tab. LXXX. Fig. 3. between *e* and *g*.

The Cavity of the Larynx is lined by a Membrane which is extremely irritable, and is every where perforated by the Mouths of small Mucous Glands, for the purpose of moistening it.

The Larynx has a number of Muscles, for its dif-

ferent motions; all of which have been already described.

The *Arteries* of the Larynx are the two Superior Laryngeals, which come from the External Carotids, and the two Inferior Laryngeals, which are sent off from the Subclavian Arteries.

The *Veins* return to the External Jugulars:

The *Nerves* are chiefly the Superior and Inferior Laryngeals, which are Branches of the Eighth Pair.

The Larynx serves the purpose of Respiration, forms and modulates the Voice, and is also useful in Deglutition.

It is the principal Organ of Voice;—for, if a Hole be made in the Trachea, and the Passage of the Larynx stopped, the Air escapes by that Opening without producing Voice.

Voice is formed by the Air, in its passage through the Glottis, acting upon the Ligaments of the Glottis and Cartilages of the Larynx and Trachea, and thus producing a Tremor;—and is different in different persons, according to the form and structure of the Larynx.

The strength of Voice is in proportion to the quantity of Air expired, and the narrowness of the Glottis.

A Tone is acute in proportion to the tension of the parts of the Larynx and Trachea in general, and of the Ligaments of the Glottis in particular.

A Tone is grave in proportion to the reverse of the above.

Speech is performed chiefly by the different parts of the Mouth, assisted by the Cavity of the Nose,—the Larynx moving only in a small degree.

When the Air passes through the Larynx without producing a Tremor, it occasions a Whisper.

When a person speaks during Inspiration, the Voice is thereby very materially altered; and, by practice, may be made to appear as coming from other places than the Mouth of the Speaker; as is the case with those who call themselves *Ventriloquists*.

T A B L E LXXX.

VIEWS of the SALIVARY GLANDS, and of the TONGUE, LARYNX, and TRACHEA.

FIG. 1.

A View of the PAROTID GLAND.

- a*, The frontal,
- b*, The temporal muscle.
- c*, The orbicularis of the eye-lids.
- d*, The levator labii superioris.
- e*, ----- anguli oris.
- f*, The zygomaticus major.
- g*, The buccinator.
- h*, The depressor anguli oris.
- i*, ----- labii superioris.
- k*, The orbicularis oris.
- l*, The masseter.
- m*, The parotid gland ;
- n*, Its duct, running across the masseter, and perforating the buccinator muscle, to open into the mouth.
- o*, The sterno-hyoid muscle.
- p*, The omo-hyoid muscle.
- q*, The sterno-mastoid muscle.
- r*, The cucullaris.
- s, s*, The large pectoral muscles.
- t, t*, The deltoid muscles.

FIG. 2.

A View of the Large SALIVARY GLANDS of the Left Side of the HEAD.

- a*, The frontal,
- b*, The temporal muscle.
- c*, The orbicularis palpebrarum.
- d*, The compressor naris.
- e*, The levator labii superioris.
- f*, ----- anguli oris.
- g*, The zygomaticus major.
- h*, The buccinator.
- i*, The depressor anguli oris.
- k*, ----- labii inferioris.
- l*, The orbicularis oris.
- m*, The nasalis labii superioris.
- n*, The lower jaw.
- o*, The masseter muscle.

- p*, The parotid gland.
- q*, A gland, occasionally found, with a duct joining that of the parotid.
- r*, The termination of the parotid duct in the mouth.
- s*, The inferior maxillary gland.
- t*, The sublingual gland, drawn a little down, from behind the lower jaw.
- u, u, u*, The common integuments.

FIG. 3.

A Front-View of the LARYNX, with the Upper Part of the TRACHEA, and THYROID GLAND.

- a, b, b, c, c*, The os hyoides ;—*a*, its body ;—*b, b*, its cornua ; *c, c*, its appendices.
- d*, The epiglottis.—The letter is placed upon a ligament which ties it to the tongue and os hyoides.
- e*, The ligament which fixes the os hyoides to the thyroid cartilage.
- f, f*, Round ligaments fixing the cornua of the os hyoides to those of the thyroid cartilage.
- g*, The thyroid cartilage ; the letter is placed upon that part of it called *Pomum Adami*.
- h, h*, The superior cornua of the thyroid cartilage.
- i, i*, The inferior cornua, joined to the cricoid cartilage.
- k*, The cricoid cartilage.
- l*, A ligament fixing the cricoid to the thyroid cartilage.
- m, m*, The two lobes of the thyroid gland.
- n*, The isthmus of this gland.
- o*, The cartilages of the upper end of the trachea.

FIG. 4.

A Back-View of the LARYNX.

- a, a*, The cornua of the os hyoides.
- b, b*, The broad ligament which fixes the os hyoides to the thyroid cartilage.
- c, c*, Round ligaments fixing the cornua of the os hyoides to those of the thyroid cartilage.
- d*, The epiglottis.
- e, e*, The lateral ligaments fixing the epiglottis to the arytenoid cartilages.

f, f, The

Fig 1

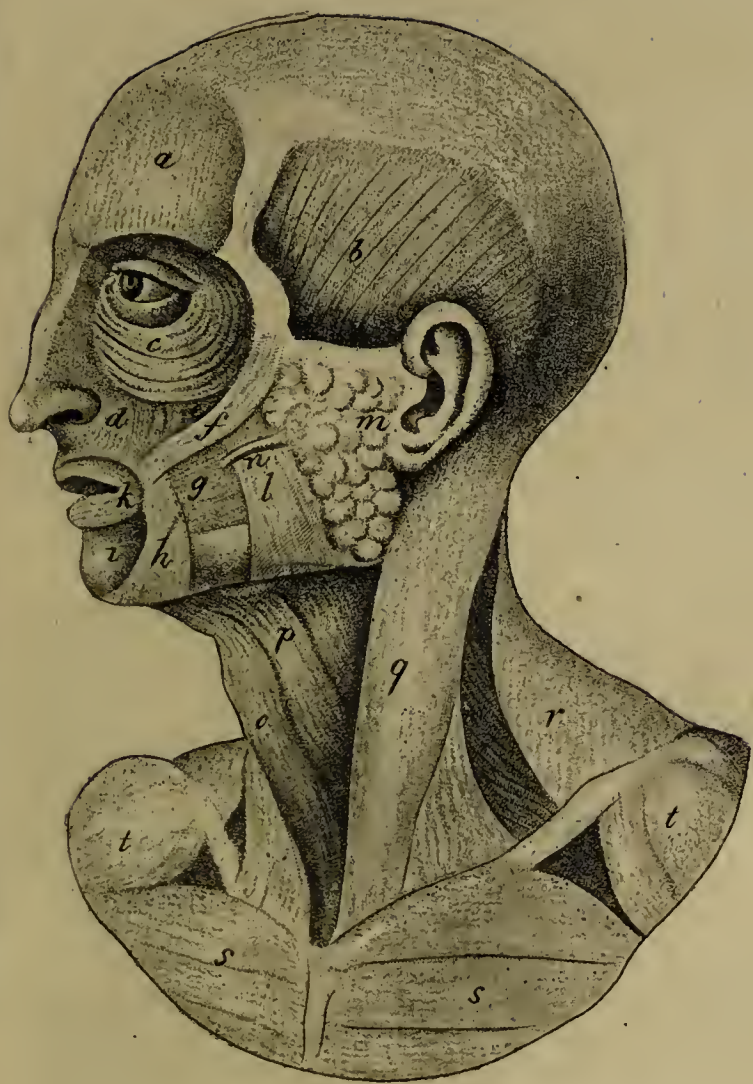


Fig 2



Fig 4

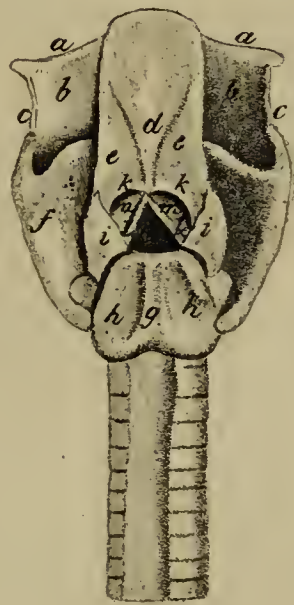


Fig 3

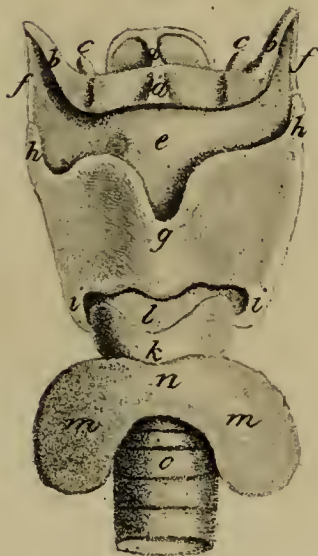


Fig 5



Fig 7



Fig 6

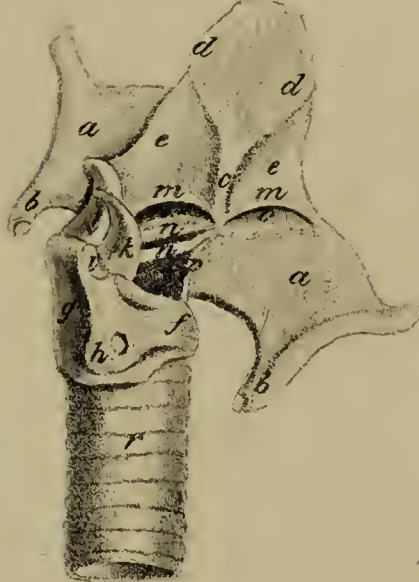
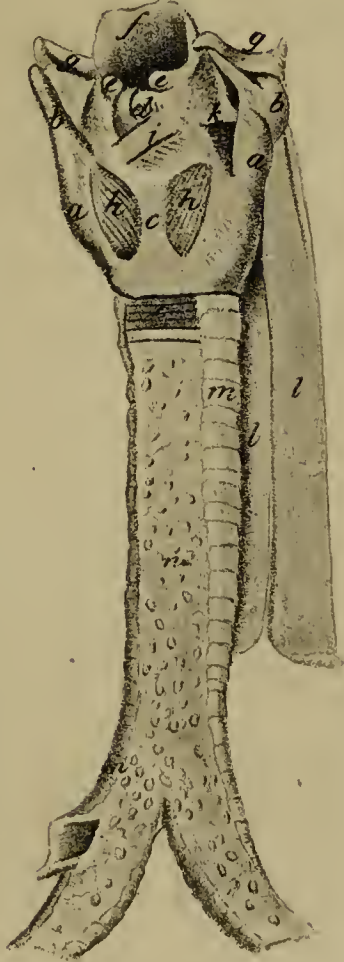


Fig 8



Fig 9



- f, f*, The hollow cavity of the thyroid cartilage, with its superior and inferior cornua.
g, The cricoid cartilage;
h, h, Prints made upon it by the posterior crico-arytenoid muscles.
i, i, The arytenoid cartilages of the glottis.
k, k, The superior ligaments of the glottis.
l, l, The inferior ligaments of the glottis, or ligaments of the glottis vera.
m, m, The ventricles of the larynx.
n, The rima glottidis.

FIG. 5.

Part of the LARYNX inclined forwards; cut longitudinally behind, and expanded, to shew the APPENDAGES of the VENTRICLES of the LARYNX.

- a, a*, The upper part of the cricoid cartilage.
b, The epiglottis.
c, c, The arytenoid cartilages.
d, d, The long crura of the arytenoid glands.—The short crura lie under, *e, e*, The superior, and, *f, f*, The inferior ligaments of the glottis.
g, g, The ventricles of the larynx.

FIG. 6.

A Lateral View of the LARYNX, the Inferior CORNUA of the THYROID CARTILAGE being separated from the CRICOID, and turned aside.

- a, a*, The inner posterior surface of the thyroid cartilage.
b, b, Its inferior cornua, separated from the cricoid cartilage, and the right cornu turned aside.
c, d, d, The epiglottis.
e, e, Its lateral ligaments; the right one is separated from the arytenoid cartilage, and turned back along with the corresponding side of the thyroid cartilage.
f, The anterior narrow part of the cricoid cartilage;
g, Its posterior large and thick part.
h, The articulating surface by which it is connected with the right inferior cornu of the thyroid cartilage.
i, The articulating surface of the cricoid cartilage, for the connection of, *k*, the right arytenoid cartilage, the capsular ligament of which is cut, and the cartilage displaced.
l, The left arytenoid cartilage *in situ*.
m, m, The superior, and,
n, n, The inferior ligaments of the glottis.
o, o, The ventricles of the larynx, the right of which is displaced along with the thyroid cartilage.
p, A section of the membrane lining the larynx.
q, A passage leading down to the trachea.
r, The trachea.

FIG. 7.

LIGAMENTS of the Outer and Back part of the LARYNX.

- a*, The epiglottis, in which are seen the orifices of many mucous glands, which exist here, as well as in the membrane which covers the other cartilages of the larynx.
b, b, The margins of the alæ of the thyroid cartilage.
c, c, The cornua of the os hyoides, joined to the superior cornua of the thyroid cartilage.
d, The cricoid cartilage.
e, e, The posterior concave surface of the arytenoid cartilages.
f, f, Ligaments fixing the base of the arytenoid to the cricoid cartilage.
g, g, Ligaments between the cricoid and thyroid cartilage.
h, A ligament fixing the arytenoid cartilages to each other.
i, i, The proper posterior ligaments of these cartilages.
k, k, An osseous granula between each of the cornua of the thyroid cartilage and of the os hyoides.
l, l, Impressions where the thyroid gland adheres.
m, m, Cartilages of the beginning of the trachea.

FIG. 8.

A View of the TONGUE, LARYNX, and TRACHEA, &c.

- a, a*, The thyroid cartilage.
b, The epiglottis.
c, A ligament connecting the epiglottis to the tongue.
d, One of the lateral ligaments of the epiglottis.
e, The cartilages of the trachea.
f, The trachea and part of the bronchi cut length-ways, to shew the internal longitudinal bands of muscular fibres, and between these the orifices of excretory ducts.
g, g, The bronchi.
h, The esophagus.
i, The pharynx.
k, One of the cornua of the os hyoides.
l, The tongue, upon which are seen the papillæ minores, and, interspersed among these, the papillæ mediæ.
m, The foramen cæcum, surrounded by the third class of papillæ, called Majores.
n, The thyroid gland.
o, The isthmus of this gland.
p, An appendix from the thyroid gland sent upward.
q, q, The crico-thyroid muscles.
r, r, The sterno-thyroid muscles.
s, The omo-hyoid muscle.
t, The sterno-hyoid muscle.
u, The hyo-thyroid muscle.

FIG.

FIG. 9.

A Back-view of the LARYNX, TRACHEA, &c.

- a, a*, The thyroid cartilage.
b, b, The right prominence, and left superior cornu of this cartilage.
c, The cricoid cartilage.
d, The arytenoid cartilages.
e, e, The arytenoid glands.
f, The epiglottis.
g, g, The os hyoides.

- h, h*, The posterior crico-arytenoid muscles.
i, The arytenoid muscles, as found in this subject.
k, The thyro-arytenoid muscle, occupying the lower region of the ventricle of the larynx of this side.
l, l, The sterno-hyoid muscles.
m, m, The cartilages of the trachea.
n, The soft or fleshy part of the trachea, stripped of its external coat, to shew it numerous glands, the excretory ducts of which open into the trachea, between the muscular fibres seen in Fig. 8.
o, The glandular part of the trachea, separated and pulled down, to shew its transverse muscular fibres.

OF THE THORAX.

THE *Thorax*, or *Breast*, extends from the Neck to the Diaphragm, and is divided into *External* and *Internal* parts.

EXTERNAL PARTS OF THE THORAX.

The *External* Parts of the Thorax, besides the common Integuments and *Mammæ*, are,

The *Muscles*, consisting of the *Pectorales*, *Subclavii*, and under end of the *Platysma Myoides* on each side, which are situated anteriorly.

The *Serrati Magni*, which are placed laterally.

The *Trapezii*, *Latissimus Dorsi*, and numerous other Muscles, placed posteriorly.

The *Inter-costales* and *Sterno-costales*, which are situated, the former between, and the latter on the inner side of the ribs.

The *Bones*, consisting of *Sternum*, *Ribs*, and *Dorsal Vertebrae*.—All these parts, excepting the *Mammæ*, have been already described.

MAMMÆ.

The *Mammæ* are two Glandular Bodies, of a circular form, situated on the anterior, and a little towards the lateral parts of the Thorax, adhering loosely by Cellular Substance to the Surface of the large Pectoral Muscles.

The term *Mammæ* is peculiar to the Breasts of Women.—In Men these parts are called *Mammillæ*;—in the Brute-kind, *Ubera*.

In the Ape, and a few other Animals, these parts are placed, as in the Human Body, upon the Thorax; but in the generality of Quadrupeds, they are situated under the Abdomen.

The *Mammæ* vary in size in different Women, and in the same Woman at different periods of life.

In Girls, previous to the age of Puberty, they are remarkably small.

About the age of fourteen, at which time the Menfes, in this Climate, most commonly begin to appear, they evolve and become prominent.

During Gestation they increase in size, and soon after Delivery, they arrive at their greatest extent.

After the age of forty-five, or from that to fifty,—the period when the Menfes generally disappear,—they decrease in size, and become soft, pendulous, and flaccid.

Under the skin, there is a large quantity of *Fat*, which constitutes a considerable portion of the bulk of the

Mamma, defends the Glandular Part, and is not found to pass into, or communicate with the Lactiferous Ducts. Tab. CXXI. Fig. 12. *e, e, e, e, f, f, f*.

The *Glandular* Part of the *Mamma* is of a whitish colour, is of the Conglomerate kind, and therefore irregular in its Substance. Tab. CXXI. Fig. 12. *G*.

It is composed of a number of smaller Masses or Glands, which are separated by Fat; and these again are divided into still smaller parts, in which the Milk is originally secreted.

Near the centre of the *Mamma*, is the *Papilla* or *Nipple*, which is of a Cylindrical form, and of a redder colour than the rest of the Skin of the Breast. Tab. CXXI. Fig. 12. *A*.

It is of different sizes in different ages and constitutions, and is always larger in the time of Gestation, or of nursing.

It is capable of distension from titillation, or when influenced by the passions of the Mind.

It is composed of a tough Cellular or Ligamentous Substance, which incloses the Lactiferous Tubes, and which is so elastic, that after the part is drawn out or distended, it readily recovers its former dimension, when the cause of distension is removed.

Upon the Apex of the Nipple, the *Orifices* of the Lactiferous Ducts appear, and are of the same number with those which enter its Base.

Around the Nipple, there is a *Circle* or *Disk*, called *Areola*,—of a different colour from the rest of the Skin of the Breast. Tab. CXXI. Fig. 12. *B. B*.

The Disk, however, varies in colour at different times of life,—being florid in Girls, of a pale brown in Women more advanced in life, and in old age of a livid and dull colour.

During Pregnancy, it is of a darker colour than at other times, in consequence of a change which takes place in the Corpus Mucosum which forms it.

Under the Skin of the *Areola*, there are numerous *Sebaceous Glands*, or *Follicles*, the Orifices of which discharge an oily Mucus, to defend the Nipple and *Areola* around it. Tab. CXXI. Fig. 12. *c. c*.

The *Arteries* of the *Mamma* are partly from the Internal, and partly from the External Mammaries; the former of which are sent off from the Subclavian, and the latter from the Axillary Artery;—the Branches entering the *Mamma* at many different places.

The *Veins* accompany the Arteries, and are distinguished by the same name.

The *Absorbents*, like the Blood-vessels of the *Mamma*, are numerous. The greater part of them pass through

through the Axillary Glands; others penetrate the Interstices of the Ribs, near the Sternum, and enter the Glands which belong to the Internal Mammary Vessels.

The *Nerves* are chiefly from the Axillary Plexus, a few Branches being also sent off from the Intercostals.

From the extremities of the Arteries in the Substance of the Mamma, numberless Tubes arise, called *Ductus* or *Tubuli Lactiferi*. They gradually unite into Trunks, run in a radiated manner towards the root of the Nipple, and becoming greatly enlarged in the time of Suckling, serve as Reservoirs in which the Milk is contained. Tab. CXXI. Fig. 12. *b, b, b.* Fig. 13. 14.

The Lactiferous Ducts are accompanied, in the Substance of the Mamma, by a *tough white Elastic Substance*, which follows them to the Nipple.

At the root of the Nipple, they become contracted, and are there from *Twelve* to *Eighteen* in number. Tab. CXXI. Fig. 13. 14.

Either from the want of uniformity, however, with respect to their number in different Subjects, or from the difficulty of perceiving them, they have been variously estimated by different Authors.

Near the root of the Nipple, they have been supposed by DR MECKEL to form a circle of communication;—but this has been ascribed, by still later Anatomists, to a laceration of Vessels. Numerous Preparations and Experiments,—particularly that of throwing in an Injection at one Duct, and finding that it fills one part only of the Mamma, without returning by any other Duct,—seem sufficiently to indicate, that there is no such circular communication.

In the Substance of the Nipple, the Lactiferous Tubes are at a little distance from each other, and are coiled up in such a manner, that the spontaneous flow of the Milk is prevented, unless it be accumulated in a large quantity.

But when the Nipple is drawn out and extended,—as by the application of the Child's Mouth,—the Ducts become straight and parallel to each other, so as to allow an uninterrupted flow of the Milk.

After Sucking, the Nipple, and consequently its Ducts, immediately recover their former situation.

Sometimes one or more of the Lactiferous Ducts terminate upon the Surface of the Areola, from which MORGAGNI supposed, that the Glands there were of the Lactiferous kind.

In children of both Sexes, the Mammæ are merely Cutaneous Tubercles, and at the time of Birth contain a *Milky-like Fluid*, which can be readily squeezed out.

This Fluid commonly disappears a short time after Birth;—but there are various Examples on record, where Milk has been brought to the Breasts, both of young Girls and old Women, by the frequent application of a Child to the Nipples, and where there was no cause for suspecting this to be the consequence of Impregnation. Nor are instances wanting of Milk having been brought to the Mamillæ of Men, by the same application.

The Mammæ add much to the ornament of the Sex, but serve in particular for furnishing Nourishment to the Child, which is conveyed through the medium of the Nipple.

The Secretion begins soon after Delivery, and continues to flow for many months, and even for some years, if the Woman suckle her child; and the more frequently the Milk is extracted, the greater is the quantity received in a given time.

The operation of Sucking depends upon the principles of the Air-pump.—The Child embraces the Nipple closely with its Lips, which prevents the external Air from entering, draws the Ducts to a straight line, and prepares a space for the Milk, which is forced from the Breast by the pressure of the Atmosphere, and flows to the Mouth in the manner a Fluid follows the Piston of a common Pump or Syringe.

INTERNAL PARTS OF THE THORAX.

THE Mammæ and Muscles, covering the fore and lateral parts of the Thorax, being turned aside, and the Ribs afterwards cut from the Sternum and turned back, the *Internal Parts* of the Thorax are brought into view.

They consist of the *Pleura*, which lines the Thorax; the *Mediastinum*, which divides it into right and left Cavities, and contains several Vessels, Nerves, &c. between its Layers;—the *Pericardium* and *Heart*, which occupy the middle;—and the *Lungs*, which surround the Heart, and fill the greater part of the Thorax.

PLEURA.

The *Pleura* is a Membrane of considerable strength, which lines the inner side of the Thorax, and covers the most of its Contents. Tab. LXXXVI. Fig. 1. *C, c, c.*

Its External Surface is *Cellular*, and adheres closely to the parts which surround it.

Its Internal Surface is *smooth* and *polished*, being moistened by a Serous Fluid, which exudes from its Arteries.

It is divided into *two lateral Sacs* or *Pleuræ*, the form of which corresponds exactly with that of the surrounding Bones of the Thorax.

The *Pleuræ* adhere to the Periosteum of the Ribs, line the Intercostales and Sterno-costales, the Sternum, and Dorsal Vertebrae, and cover the Pericardium, Lungs, and Lateral or Flehy parts of the Diaphragm.

Behind the Sternum, the *Pleuræ* are contiguous to each other, and form the *Partition* called *Mediastinum*, which extends between the Sternum and Vertebrae.

The *Arteries* of the *Pleura* are from those of the adjacent parts, viz. from the Intercostal, Mammary, Diaphragmatic, Bronchial, and Esophageal Arteries.

The *Veins*, which return the Blood, accompany the Arteries, and are distinguished by the same name.

The *Nerves* are from the Intercostals and Diaphragmatics,

matics, but too small to be easily traced; and the Membrane itself is not observed to possess much Sensibility in the sound state.

The Pleura, by its smoothness, facilitates the motions of the Heart and Lungs, divides the Thorax into Cavities, and strengthens its containing and contained parts.

MEDIASTINUM.

The *Mediastinum*, so named from its situation in the middle of the Thorax, extends, as has been already observed, between the Sternum and Vertebrae; but is intercepted by the Heart and root of the Lungs, and divides the Thorax into two distinct Cavities, which have no communication with each other.

It is formed by a reflection of the Pleura, and is of course double, and contains between its Layers a considerable quantity of Cellular Substance, by which they are united. Tab. LXXXVI. Fig. 1. C.

It is divided into *Anterior*, and *Posterior Mediastinum*, the former of which is situated at the fore, and the latter at the back part of the Thorax.

The *Anterior Mediastinum* is connected before to the Sternum; and behind, to the Pericardium and large Vessels of the Heart. Tab. CXLII. K.

The two Layers of the *Anterior Mediastinum* are closely applied to each other, excepting at the upper part of the Thorax, where they are separated by the remains of the *Thymus Gland*. Tab. LXXXVI. Fig. 1. D.

At the upper part of the Thorax, it lies exactly behind the middle of the Sternum; but in its descent, it inclines gradually to the left edge of that Bone.

In consequence of its obliquity, a pointed instrument, pushed through the centre of the Sternum, is generally found to pass into the right Cavity of the Thorax.

Frequent deviations, however, from this general rule, have been met with.—In particular, LIEUTAUD and SABATIER relate several instances where the *Anterior Mediastinum* was found to descend along the middle of the Sternum; and others, though rare, where it descended even to the right side of this Bone.

The *Posterior Mediastinum* reaches from the root of the Lungs and back-part of the Heart, to the Dorsal Vertebrae.

Between the Layers of the *Posterior Mediastinum*, a *Triangular Space* is formed, in which are situated the under end of the Trachea, the Esophagus, the Aorta Descendens, the Vena Azygos, and Thoracic Duct, with the Eighth Pair of Nerves.

The *Blood-vessels* of the *Mediastinum* are from those of the neighbouring parts:—The *Anterior Mediastinum* is supplied by Branches from the Subclavian, Internal Mammaries, and Diaphragmatics,—and the *Posterior Mediastinum*, by Branches from the Intercostals and Esophageals.

The *Veins* accompany the arteries, and have the same names.

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The *Mediastinum* divides the thorax into two Cavities, supports its general Contents, hinders one Lung from pressing upon the other when the Person lies on his side, and prevents Fluids,—which, in consequence of accident or disease, may be contained in the Cavity of the Thorax,—from passing from one side to the other.

PERICARDIUM.

The *Pericardium*, *Sac*, or *Capsule* of the Heart, is one of the strongest Membranes of the Body, and its size such as to be properly adapted to that of the Heart which it contains. Tab. LXXXVI. Fig. 1. E, E. Tab. LXXXV. G, G.

It is formed of *two Layers*; the *External* of which is a continuation of the *Anterior Mediastinum*, which afterwards passes to the Lungs and lateral parts of the Diaphragm.

The *Internal Layer* is smooth, tendinous-like, polished on its inner Surface, and stronger than the other.

It adheres so firmly to the Tendinous part of the Diaphragm, as not to be separated from it without much difficulty.

The *Pericardium* extends a considerable way beyond the Base of the Heart, and includes the large Blood-vessels, as far as the Roots of their first principal Branches, in consequence of which it forms several Angles, which have been termed *Cornua* of the *Pericardium*.

While the *External Layer* is reflected to cover the parts which surround it, the *Internal* is also reflected, first over the roots of the large Blood-vessels, and then over the Heart, to form its proper covering; in the same manner the *Tunica Conjunctiva* is reflected from the Eyelids to cover the fore-part of the Eye.

From the ends of the *Extreme Arteries* upon its Surface, a Fluid, called *Liquor Pericardii*, is discharged, by which it is lubricated, and the effects of Friction diminished.

The *Liquor Pericardii* is commonly found, after death, in the quantity of a few Drachms, though not unfrequently of one or two Ounces.

Its colour is redder in a young Subject than in a Person advanced in life, in whom it becomes paler, or more of a straw-colour.

The *Arteries* of the fore-part of the *Pericardium* are from the *Internal Mammaries* and *Diaphragmatics*; those of its back-part from the *Bronchials* and *Esophageals*.

The *Veins* correspond with the *Arteries*, and have the same names.

The *Pericardium* preserves the Heart *in situ*, defends it from being injured by the parts which surround it, and restrains its inordinate motions.

HEART.

The *Heart* is a hollow Muscle, divided into different Cavities,

Cavities, and inclosed in the Pericardium. Tab. LXXXI. F.

It is situated in the Cavity of the Thorax, behind the Sternum, between the Right and Left Lungs. Tab. LXXXVI. Fig. 2.

It is of a *Conical* figure, flattened at one side, and is divided into *Base*, *Body*, and *Apex*, with a *Superior* and *Inferior Surface*, and a *Right* and *Left Margin*.

The Base is placed backwards next the Spine, while the Body and Apex are turned forwards, and obliquely over to the left side. Tab. CLIX.

In Quadrupeds, the Heart is placed upon a line with the Sternum; the point of it being the only part which touches the Diaphragm.—In the Human Body, the Apex is but a little lower than the Base, and projects between the two Lobes of the left Lung, behind the Cartilages of the Fifth and Sixth True Ribs of the left side, or a little below the left Nipple, where the Pulsation may be felt. The situation, however, varies in a small degree, according to the position of the Body, and state of Respiration. Tab. LXXXI. F.

Though this be the common situation of the Heart, a few rare and singular Instances have occurred, where it has been found to occupy the right side of the Thorax; and a Displacement has sometimes happened, in consequence of different kinds of Tumours in the left side of the Thorax.

The *Superior* or *Anterior Surface* of the Heart is convex, and is opposed to the Posterior Surface of the Sternum; the anterior edges of the Lungs intervening.

The *Inferior* or *Posterior Surface* is flat, and rests upon the Tendon of the Diaphragm which supports it. The Heart is not much affected, however, by the motions of that Muscle in time of Respiration; its Tendon moving only in a small degree. Tab. LXXXVI. Fig. 2.

The right side of the Body of the Heart is sharp, and is called *Margo Acutus*.

The left side is round, and is termed *Margo Obtusus*.

The Base is formed of a Right and Left *Auricle*, and the Body of a Right and Left *Ventricle*.

When the Heart is distended, the Right Auricle, and part of the corresponding Ventricle, occupy the right, and the rest of the Heart the left Cavity of the Thorax.

The Heart is connected above and behind to the upper and back part of the Thorax, through the Medium of the *great Vessels* which go into, or pass out from it. Tab. CLIX.

The other parts of the Heart are free, being merely contiguous to the inside of the Pericardium.

The External Surface of the Heart is covered with a thin, smooth *Membranous Coat*, which is a Reflection of the inner Layer of the Pericardium, and which gives additional strength to its Flethy Fibres.

Between this Coat and the Substance of the Heart, there is commonly a considerable quantity of *Fat*, which lubricates it, and facilitates its motions.

The Substance of the Heart consists of *Muscular Fibres*, firm and more closely connected than the Fibres of Muscles generally are in the other parts of the Body.

The Fibres of the Heart run in different directions, longitudinally and transversely, but most of them obliquely. Tab. LXXXII. Fig. 5.—10.

Many of them run over the Point of the Heart from one Surface to the other, and the whole are so much twisted and folded, and so variously intermixed, as to render it difficult to unravel or describe them.—In general, however, their course is such as to lessen the Cavities of the Heart in all their dimensions.

The *Cavities* of the Heart are lined with a Membrane extremely thin, but dense and strong, to defend it against the pressure of the Blood.

The Heart is formed of an *Anterior* or *Right*, and a *Posterior* or *Left* side, or of a *Right* and *Left Heart*, joined together by a *Partition*, which prevents the two sides from having any direct communication with each other.—The terms Right and Left, however, are more applicable to the Heart of the Quadruped, and those of Anterior and Posterior to the Human Heart.

Each side of the Heart is furnished with a set of *Veins*, with an *Auricle*, a *Ventricle*, and an *Artery*, and also with two sets of *Valves*, one of which is situated between the Auricle and Ventricle, the other between the Ventricle and Artery.

At the right side of the Heart are Two Veins, called from their large size *Venæ Cavae*; the one *Superior*, the other *Inferior*. Tab. LXXXV. P. T.

The *Superior Vena Cava*, called also *Vena Cava Descendens*, conveys the Blood from the upper parts of the Body; and the *Inferior Vena Cava*, termed likewise *Ascendens*, conveys it from the lower parts; and both terminate in the right Auricle. The Blood in the Auricle is prevented from returning by the fulness of the Veins, and by the pressure of the Blood *a tergo*.

The *Auricle* is situated upon the right, and partly upon the back part of the Heart, and is divided into the *Right Sinus Venosus*, and *Proper Auricle*. Tab. LXXXV. W. —Z.

The *Sinus Venosus* is formed by the union of the Two *Venæ Cavae*, which swell out towards the anterior and left side. It is notched at its anterior edge, is a Muscular Bag of considerable strength, and both upon its outer and inner Surface is uniform and smooth. Tab. LXXXV. W, Z, Y.

At the upper and left side of the Sinus, is the Projection or Appendix, termed, from its supposed resemblance to the Ear of a Quadruped, *Proper Auricle*. It is formed by a blind Sac, which is serrated and notched on its posterior edge, and convex or rounded on the other, and terminates obliquely in an obtuse point. Tab. LXXXV. W, X.

The Sinus and Proper Auricle form one common Cavity, have no Valve between them, and are therefore filled and emptied at the same time.

Where the two Cavities meet in the Hearts of Quadrupeds, there is a *Projection* seen in the Sinus Venosus, called *Tuberculum LOWERI*, which is supposed to prevent the Blood of the one Cava from rushing upon that of the other, and to direct it into the Auricle.

At

At the meeting of the two Cavæ in the Human Heart, an angle is formed, which also has frequently got the name of *Tuberculum LOWERI*.—This Term, however, is peculiar to the Projection in the Hearts of Brute Animals.

Under this Angle or joining of the Venæ Cavæ, there is the Vestige of the *Foramen Ovale*, which, in the Fœtus, forms a communication between the Right and Left Auricles; but in the Adult, is filled up by its Membrane, and forms the *Fossa Ovalis*. Tab. LXXXIV. *q*.

The Fossa Ovalis has thick and strong sides, called *Columnæ Foraminis Ovalis*, *Isthmus VIEUSSENII*, vel *Anulus Fossæ Ovalis*.

At the left side of the Mouth of the Inferior Cava, where it joins the Sinus, is the *Valve of EUSTACHIUS*. Tab. LXXXIV. *o, o*.

It is in form of a Crescent, with the convex edge fixed to the union of the Sinus and Cava, and the concave edge turned obliquely upwards, reaching about half way over the Mouth of the Cava. Its size and appearance, however, vary much in different Subjects.

Its posterior Cornu is continued with the left side of the Isthmus of the Foramen Ovale; the other end vanishes in the opposite side of the Sinus.

It is equally distinct in the Adult as in the Fœtus; but in the former it is frequently found reticulated, or Cribiform, which appearance is seldom, though sometimes, met with in the latter. Tab. LXXXII. Fig. 11. *F*.

In the Adult, it is supposed to prevent the Blood of the Auricle from passing into the Inferior Cava; and in the Fœtus, to direct the Blood of the Inferior Cava to the Foramen Ovale.

Upon the left side of the Valve of EUSTACHIUS, in the under part of the Auricle, is the *Orifice or Termination* of the great Coronary Vein of the Heart.

Over the Orifice of this Vein, there is a Semilunar Valve, to prevent the Blood in the Auricle from passing into the Vein. Tab. LXXXIV. Fig. 1. *p*. Tab. LXXXII. Fig. 11. *G*.

The inner side of the proper Auricle is readily distinguished from the Sinus, by having a number of *Fleshy Pillars* in it, which, from their supposed resemblance to the Teeth of a Comb, sometimes obtain the name of *Musculi Auriculæ Pectinati*. Tab. LXXXIV. Fig. 1. *m, n*.

The Musculi Pectinati have smaller Columns running in different directions, giving the whole a reticulated appearance.

Between the Fleshy Pillars, are *Depressions or Furrows*, where the sides of the Auricle are thin, and semi-transparent, being chiefly formed of the outer and inner Membrane only.

At the under and left side of the Sinus Venosus, and opposite to a *Groove* situated externally between the Auricle and Ventricle, there is a *Hole*, above an inch in diameter, which opens into the upper and right part of the corresponding Ventricle. Tab. LXXXIV. Fig. 1. *s, s*.

The Right Auricle receives the Blood from the Venæ

Cavæ and Coronary Veins, and, by its Muscular contraction, discharges it into the corresponding Ventricle, out of which it is prevented from returning by a Valve, called *Tricuspid*, placed within the Ventricle.

The *Right or Pulmonary Ventricle* is situated on the fore-side of the Heart, is of a triangular form, and much thicker and stronger than the corresponding Auricle. Tab. LXXXV. *a, b, c, d*.

It has many strong Eminences, Columns, Lacertuli, or Cords, called *Columnæ Carneæ*. Tab. LXXXII. Fig. 11. *O, O*.

The *Columnæ* run in different directions, but the strongest of them longitudinally, and are of various sizes, forming so many distinct Muscles, which are extremely compact in their structure, and compose a beautiful, intricate, and irregular Net-work.

In general, they adhere through their whole length to each other, or to the sides of the Ventricle; but many of them are loose in their middle, and may be raised by a Probe put under them.

They assist the Ventricle in its *Systole* or contraction, and prevent it from being overstretched in its *Diastole* or dilatation, and agitate the Blood in its passage through the Ventricle.

They are supposed to bring the opposite sides of the Ventricles completely together, during its contraction.

Between the *Columnæ* are many deep *Grooves, Pits, or Foveæ*, into all of which the Blood readily enters.

Around the Passage, between the Auricle and Ventricle, there is a *Tendinous Margin or Ring*, from the whole edge of which a circular Membrane is sent off, called *Valvula Tricuspidis*, or *Triglochis*, from its having Three principal points or divisions. Tab. LXXXIV. Fig. 1. *r, r*. Fig. 3. *e, e*. Tab. LXXXII. Fig. 11. *K, K*.

From the edge of the Tricuspid Valve, many small round *Tendinous Cords* of unequal size are sent off. Tab. LXXXIV. Fig. 3. *f, f, g, g*.

The *Cordæ Tendineæ* descend obliquely within the Ventricle in the same direction with the Valve from which they arise.

They are fixed to the extremities of a few strong *Papillæ* or *Columnæ Carneæ*, which are joined by their other extremities to the corresponding sides of the Ventricle. Tab. LXXXIV. Fig. 3. *b, b*.

The Tricuspid Valve prevents the reflux of the Blood to the Auricle, during the contraction of the Ventricle.

The Tendons allow the Valve to be pushed back by the Blood, until a Septum or Partition is formed by it at the Mouth of the Ventricle, during the contraction of the latter.—The *Papillæ*, by their contraction, prevent the Valve from going into the Auricle.

The Valve is opened and pressed back by the Blood in its passage from the Auricle to the Ventricle.

The upper and left side of the Ventricle becomes smooth and uniform, and leads to a large Opening, about an inch in diameter, which is the Mouth of the Pulmonary Artery.

The Right Ventricle, by its dilatation, receives the Blood

Blood from the Auricle, and sends it by a strong and sudden convulsive contraction, to the Pulmonary Artery, from whence it is prevented from returning by Three Valves placed in the Mouth of the Artery.

The Valves at the Mouth of the Pulmonary Artery are called *Valvula Semilunares*, vel *Sigmoideæ*, from the resemblance of their edges to those of a Crescent. Two of them are placed in the fore, and one in the back part of the Artery. Tab. LXXXIV. Fig. 3. *i, i, i*.

Each of them forms a *small Sac*, one edge of which adheres to a third part of the circumference of the inside of the Artery; the other edge is loose in the Cavity of that Vessel, and is somewhat thicker and stronger than the rest of the Valve,—the thickened edges serving as Ligaments to it. Tab. LXXXII. Fig. 13. *E, E, E*.

The loose edge has a *general Curve*, divided into *two smaller ones*, which meet in a *point* at the middle.

The Valves are chiefly formed of a doubling or extension of the inner Coat of the Artery.

In the middle point, or loose edge of each of the Valves, there is a small hard *Triangular Granula*, of a somewhat redder colour than the rest of the Valve, called, from its reputed Discoverers, *Corpusculum AURANTII*, vel *Corpusculum MORGAGNI*; or, from its resemblance in shape to the Seed of the Sesamum, *Corpusculum Sesamoides*. Tab. LXXXIII. Fig. 5. *a, a, a*.

The Corpuscles complete the Valves at the centre of the Artery, and enable them to make a stronger resistance against the Blood, while the Artery is in action.

The Semilunar Valves are *concave* towards the Artery, *convex* towards the Ventricle, and, when shut, their loose edges are opposed to each other, so as to enable them to form a complete *Partition* between the Ventricle and Artery.

Opposite to the Semilunar Valves, the Artery bulges out, and forms *Three Projections*, which have corresponding Pits or Depressions within, and are called, from their Discoverer, *Sinus VALSALVÆ*. Tab. LXXXV. *e*.

The *Sinuses* of VALSALVA are of the same nature with those Dilatations which are found in the Veins and Lymphatics, between their sides and Valves; and, like them, are partly formed by the pressure of the Fluids upon the sides of the Vessels.

The Pulmonary Artery receives the Blood from the Right Ventricle, and, by its contractile power, assists the Ventricle in driving it through the Lungs.

The Semilunar Valves, pressed back by the Blood in the Artery, prevents its return into the Ventricle.

The Valves are opened again in consequence of their being driven towards the sides of the Artery by the current of the Blood, upon the next contraction or Stroke of the Ventricle.

The Pulmonary Artery passes behind the Sternum, and separates into *Right* and *Left Branches*, which go to the corresponding parts of the Lungs. Tab. LXXXV. *f, g, b*.

The two Branches of the Pulmonary Artery, like

those of the Arteries of the Viscera in other parts of the large Cavities, suddenly divide into still smaller Branches.

From the extreme Arteries of the Lungs, corresponding Veins arise, which are merely the continuation or reflection of the Arteries, without any intermediate Cells or Dilatations.

The Pulmonary Veins, in the Substance of the Lungs, gradually unite, and form *Four Principal Trunks*, which terminate in, and carry the Blood to the Left Auricle. Tab. LXXXV. *i, k, i, k, l*.

Of the Pulmonary Veins, *Two* come from the right, and *Two* from the left Lung, and terminate in the corresponding sides of the Left Auricle. Tab. LXXXIV. Fig. 2. *f, g*.

The *Left Auricle* is considerably thicker and stronger than the Right, and is also divided into Sinus Venosus and Proper Auricle, which form one common Cavity without the intervention of any Valve. Tab. LXXXIV. Fig. 2. *a, b, c*.

The *Left Sinus Venosus*, called also *Sinus Pulmonalis*, is turned towards the Spine, is more of a cubic form than the Right one; but resembles it in the uniformity and smoothness of its outer and inner Surfaces.

From the fore and left part of the Sinus, the *Proper Auricle* projects, and forms a distinct flat *Appendix* or *Bag*, with different Curvatures or Indentations upon its edges. Tab. LXXXV. *m*.

The inner part of the Proper Auricle is *longer*, but *narrower* than that on the right side; like it, however, it is formed of Columnæ, with Furrows between them. Tab. LXXXIV. Fig. 2. *m, n*.

The Proper Auricle is somewhat less capacious than that on the right side; but the Sinus is as much larger as to render the two common-Cavities of the right and left Auricles nearly equal.

The two Auricles have a *Fleshy Septum* between them, in which, as has been already mentioned, there is the *Foramen Ovale* in the Fœtus;—but in the Adult the Partition is generally perfect. Tab. LXXXIII. Fig. 3. *G*.

From the under part of the Sinus Venosus, a *Passage* leads down to the Cavity of the Left Ventricle, Tab. LXXXIV. Fig. 2. *o*. and is opposite to a *Groove* seen externally between the Auricle and Ventricle, similar to that on the right side. Tab. LXXXV. *m*.

The Left Auricle receives the Blood from the Pulmonary Veins, and, by its Muscular contraction, drives it into the Left Ventricle, from which it is prevented from returning, by a Valve in the Ventricle, called *Mitralis*.

The *Left Ventricle* is situated in the posterior and left part of the Heart. Tab. LXXXV. *m, n, o, p*.

Its sides are about *three times thicker* and *stronger* than those of the Right Ventricle; the thickness being in proportion to the force required to propel the Blood to the most remote parts of the Body. Tab. LXXXIV. Fig. 3.

It is *narrower* and *rounder*, but considerably *longer*, both

on its External Surface and in its Internal Cavity, than the right Ventricle, and generally descends some way below the other, and forms the Apex Cordis. Tab. LXXXV. Tab. LXXXIV. Fig. 3.

The Cavity is commonly described as being less than that of the Right Ventricle; but the apparent difference, which takes place after death, is accounted for with seeming propriety by some Authors,—from the Left Ventricle being then for the most part found empty, and the Right one full, and from the greater degree of contractility in the former.

That the capacity of the Cavities of the right and left sides of the Heart is more nearly equal during life than after death, or than it is generally supposed to be, is evident from the appearance of the Heart of the Human and also of the Brute kind, and from Injections thrown into the two sides of the Heart, where the force applied is in proportion to the relative strength of each side.

The inner Surface of the Left Ventricle has the same general appearance with the Ventricle of the right side, and only differs from it in having its Columnæ Carneæ larger, firmer, and stronger.

In the Passage of communication between the Auricle and Ventricle, there is a *Ring*, from which a *Circular Valve* goes off, with all its Apparatus similar to that between the right Auricle and Ventricle, and differing in no respect from it in structure and use, excepting in being stronger, and in being divided into two principal Portions only. Tab. LXXXII. Fig. 14. F, G, H.

This Valve has been supposed to bear some resemblance to a *Bishop's Mitre*, from which it has been called *Valvula Mitralis*. Tab. LXXXIV. Fig. 3. *q, r, s, t, u*.

One of the Portions of this Valve is larger than the other, lies over the Mouth of the Aorta, and is supposed to cover it while the Ventricle is a-filling.

The *Valvula Mitralis* prevents the reflux of the Blood during the contraction of the Ventricle.

After the contraction is over, the Valve returns to its former situation by the impulse of a fresh current of Blood from the Auricle.

Between the Right and Left Ventricle, there is a thick, strong, impervious *Partition*, which forms a share of the general Septum Cordis, and is composed partly by the wall of the Right, but chiefly by that of the Left Ventricle; the Right being united to the Left, almost in the form of an Appendix. Tab. LXXXIV. Fig. 3. *d*, *d*.—Tab. LXXXIII. Fig. 3.

The Partition prevents any direct communication between the two Ventricles.

Opposite to the outer edge of the Septum, both upon the upper and under Surfaces of the Heart, there is a *Groove* in which some of the principal Trunks of the Coronary Vessels are situated. Tab. LXXXV.—Tab. LXXXIII. Fig. 3.

At the fore and right side of the *Valvula Mitralis*, and

behind the beginning of the Pulmonary Artery, there is a *Round Opening*, which is the Mouth of the Aorta, and which is nearly of the same size with that of the Pulmonary Artery.

Under this Opening, the Surface of the Ventricle becomes *smooth* and *equal*, having none of the Columnæ Carneæ which are seen on the other parts of its Cavity. Tab. LXXXIII. Fig. 5. A.

The Left Ventricle receives the Blood sent to it from the Auricle, and, by a contraction similar to, but much stronger than that of the Right Ventricle, propels it to the Aorta.

At the Mouth of the Aorta, there are *three Semilunar Valves*, with their *Corpuscula AURANTII*, perfectly similar to those of the Pulmonary Artery,—but somewhat stronger. Tab. LXXXIV. Fig. 3. *r*.—Tab. LXXXIII. Fig. 5. *a, a, a*.

On the outside of the Semilunar Valves, are the *Sinuses* of VALSALVA, resembling those of the Pulmonary Artery,—but a little more prominent. Tab. LXXXV. *r*.

The Semilunar Valves are pressed back by the Blood, and prevents its reflux during the contraction of the Aorta.—They are returned towards the sides of the Aorta, in the same manner, and from the same cause, as those in the Pulmonary Artery.

The *Aorta* passes upwards from the top of the Left Ventricle, and is situated first behind, and then on the right side of the Pulmonary Artery, and between it and the Superior Cava. Tab. LXXXV. *r, s*.

It bears nearly the same proportion in thickness and strength to the Pulmonary Artery, which the sides of the Left Ventricle do to those of the Right.

When the Aorta is about to send off the first of its large Branches at the top of the Thorax, it is of great size, and is sometimes called the *Large Sinus* of VALSALVA. Tab. LXXXV. *s*.

The Aorta receives the Blood from the Left Ventricle, and by its Muscular contraction re-acts upon it, and assists the Ventricle in sending it by numberless Branches through the different parts of the Body, from whence it is returned by the Veins to the right Auricle.

Besides the Blood-vessels already taken notice of, and which are common to the Heart and the rest of the Body, the Heart is furnished with Vessels peculiar to itself, termed *Coronary*, from a *Corona* which they form upon its Surface.

The *Coronary Vessels* consist of two Arteries and one principal Vein.

The *Coronary Arteries* arise from the Sinuses, at the Mouth of the Aorta, opposite to two of the Semilunar Valves. Tab. LXXXIII. Fig. 5. *b, b*.

One runs in a Groove between the Right Auricle and Ventricle, and supplies chiefly the right side of the Heart. Tab. LXXXIII. Fig. 2. *a*.

The

The other passes partly between the Left Auricle and Ventricle, and partly in the Groove between the Ventricles, on the fore-side of the Heart,—supplying the left side of the Heart, and communicating with the Branches of the other Artery on its upper and under Surfaces. Tab. LXXXIII. Fig. 2. *b*.

The Coronary Arteries are entirely dispersed upon the substance of the Heart, and upon the roots of the great Vessels, forming upon these some of the minute Branches, termed *Vasa Vasorum*.

The Coronary Arteries, from their situation opposite to the Valves have been supposed to be filled at a different time from that of the rest of the Arterious System;—but from Experiment, it seems now sufficiently ascertained that the Coronary Vessels have their Pulsation at the same instant with the other Arteries.

The *Coronary Veins* return the Blood from their corresponding Arteries. The greater part of them join into a Trunk, called the *Great Coronary Vein*, which, after making a turn from the left side, and running between the Left Auricle and Ventricle, terminates in the under part of the Right Auricle, where it is covered by its Semilunar Valve. Tab. LXXXIII. Fig. 3. *d*.

Other Coronary Veins, much smaller than the former, terminate in different parts of the right side of the Heart.

The *Absorbents* of the Heart go to the neighbouring Lymphatic Glands.

The *Nerves* are from the Great Sympathetics and Eighth Pair.

With respect to the Circulation of the Blood in general:—The Veins, by a slow and equal motion, and without Pulsation, return the Blood from all the different parts of the Body, which, on account of the quantity and stimulating quality of the Blood, contract suddenly and at the same time, and send it to the Ventricles.

The Ventricles, from the same cause which stimulates the Auricles, and from the stroke they receive from them, contract convulsively, with a force proportioned to the thickness of their sides, and send the Blood to the Arteries; and, during their contraction, they are thrown by the dilating Auricles against the Ribs, where the stroke occasioned by the Pulse of the Heart may be felt.

The Arteries, by their contractile power and elasticity, send the Blood suddenly to the Veins, through which, by the united force of the Ventricles and Arteries, and likewise, as some suppose, by a contractile power of the Veins and pressure of the surrounding parts, it is driven again to the Auricles.

In its course, the Blood performs a double Circulation,—one called the Lesser, or that through the Lungs,—the other called the Greater, or that through the rest of the Body.

In the former, it passes from the Right Ventricle to the Lungs, and returns to the Left Auricle.—In the latter, it goes from the Left Ventricle to the different parts of the Body, and returns to the Right Auricle.

During this Circulation, the Auricles and Arteries, and the Ventricles and Veins, act in concert, connecting and dilating at the same time.

The Heart is the Centre of the Vascular System, and the principal Agent in the Circulation of the Blood.

The right side of the Heart receives the Blood, which is contaminated in passing through the Body, and sends it to the Lungs, where it is purified through the medium of the Air.

From the Lungs, the Blood, now purified, is returned to the left side of the Heart, to be circulated through all the other parts of the Body, thereby imparting Nourishment, Growth, and Strength, to the general System. The Heart being found also to be the source of Sensibility, Irritability, Motion, and Animal Heat.

LUNGS.

THE *Lungs* are two soft spongy Bodies, which occupy the far greater part of the Cavity of the Thorax.

They completely fill the two Bags of the Pleura, and are every where in contact with the parts adjacent; no Air intervening between them and the Thorax. Tab. LXXXVI. Fig. 1. 2.

In *Figure*, they have been compared to that of the Foot of an Ox, with the back part turned forwards;—or, their shape corresponds exactly with the inside of the Thorax; being rounded next the Ribs, hollow towards the Diaphragm, and irregularly flattened and depressed next the Mediastinum and Heart.

They are of a reddish or pink colour in Children, of a light blue or greyish colour in Adults, and more of a purple and livid colour in Old Age, at which period they are also observed to be tinged with black spots, proceeding from a matter secreted in their Substance.

They are joined to the Neck, by the Trachea; to the Spine, by the two Layers of the Mediastinum, which serve them as Ligaments; and to the Heart, by the Pulmonary Vessels; the rest of them being free and unconnected, unless when an adhesion takes place in consequence of Inflammation.

They are divided into *Right* and *Left Portions*, or *Lungs*, which are separated from each other by the Heart and Mediastinum, and which have no communication, except through the Medium of the Trachea.

Each of the Lungs is again divided into large Portions, called *Lobes*, which facilitates their motion and the dilation of their Cells.

Of the Lobes, *Three* belong to the Right Lung, corresponding with the larger Bag of the Pleura, and *Two* to the Left, between which there is a Notch or Sinus, occupied by the Point of the Heart. Tab. LXXXIII. Fig. 1.

Each of the Lobes is subdivided into many smaller parts,

parts, termed *Lobules*, which are of different sizes, and of an irregular angular form. Tab. CXLIII. CXLIV.

The Lobules diminish in size, and degenerate at last into small *Vesicles* or *Cells*, which constitute a large share of the Lungs, and which are merely visible to the naked Eye.

The Cells of the Lungs are purely Membranous, of an irregular figure, compressed and closely connected, and have a free communication with each other.

Between the different Lobes, Lobules, and Cells, a large quantity of common Cellular Substance, destitute of Fat, is interposed, which unites and strengthens them, and allows the Blood-vessels to be minutely dispersed over them.

The Cells of the Lungs have no communication with this common Cellular Substance; for when Air is blown into it, the Lobules are compressed; but when the Air is blown in through a Branch of the Trachea, the Cells are again distended, and the Lobules recover their former dimensions.

In the Fœtus, the Cells are empty and in a collapsed state;—but as soon as Respiration begins, they become distended, and continue so during life, and in every state of Respiration, and even in the recently dead Body:—But if an Opening be made into the Cavity of the Thorax, whether in the living or dead Body, and the Air in this or in any other way admitted, they immediately collapse by their weight and elasticity, the pressure of the Air being then the same on the outer Surface of the Lungs, and inner Surface of the Trachea.

The Lungs are covered by *Two Coats*, an External or Common, and an Internal or Proper one.

The *External* or *Common Coat*, is a continuation or reflection of the Pleura, is extremely thin, but dense; and, like the other parts of the Pleura, is found to possess little Sensibility. It forms a general covering to the Lungs, but does not enter between their different Lobules.

The *Internal* or *Proper Coat* adheres so firmly to the former, as to appear to constitute part of its Substance. It not only covers the Lungs, but insinuates itself between their Lobules, and is intimately connected with their Cellular Substance.

Besides the Cells, various kinds of Vessels, viz. the *Vessels* or *Branches of the Trachea*, *Blood-vessels*, and *Absorbents*, together with small Branches of *Nerves*, enter into the composition of the Lungs.

TRACHEA.

The *Trachea*, vel *Aspera Arteria*, so called from the inequality of its Surface, and from its conveying Air, begins at the under part of the Cricoid Cartilage, and descends in the fore-part of the Neck, between and behind the Sterno-hyoidei and Sterno-thyroidei. Tab. XXXVI. Fig. 1. g. Tab. LXXX.

From the Neck, it passes into the Thorax, where it is

situated between the Layers of the upper part of the posterior Mediastinum.

Behind the Curvature of the Aorta, and opposite to the third Dorsal Vertebra, the Trachea divides into two Lateral Branches, termed *Bronchi*; one of which goes to the Right, and the other, which is the longer of the two, to the Left Lung. Tab. LXXXIII. Fig. 1. Q, R, S. Tab. LXXX. Fig. 8. g, g.

The Bronchi are divided into Branches, which by degrees become smaller, and at last terminate in the Cells of the Lungs, which communicate so freely with each other, that, upon introducing Air into any of these Branches, a large portion of the Lungs may be inflated.

The Trachea consists of *Cartilaginous Rings*, about sixteen or eighteen in number, which give strength and firmness to it, and preserve it constantly open for the transmission of Air. They are incomplete behind, where the Trachea is formed of a *soft Fleshy Substance*, which yields to the Esophagus in the time of Deglutition. Tab. LXXX. LXXXIII.

Each Cartilage forms a large Segment of a circle, about a line or one twelfth of an inch in breadth, and one fourth of a line in thickness.

The Cartilages are situated horizontally, with their edges opposed to each other; small spaces intervening between them.

They are united to each other, by a Ligamentous Substance, which is so elastic, that when the Lungs are taken out of the Body, it draws the Cartilages closely together.

At the upper end of the Trachea, two or three of the Cartilages are frequently joined by an union of Substance; but below this, they are perfectly distinct from each other.

The Bronchi, at their beginnings, have the same kind of Cartilages with the Trachea; but after they enter the Lungs, each Cartilaginous Ring is divided into two or three pieces, which, however, are so connected to each other, as to go completely round the Bronchi, and keep the Passage open and free from compression.

The Trachea has several *Coats* entering into its composition, some for strengthening it, others for giving it a certain degree of motion, viz.

A *Cellular Coat*, which, in the Thorax, is covered by the Mediastinum;

An *Elastic Ligamentous Coat*, which passes along the Trachea, and also upon the different Branches in the substance of the Lungs, adding much to the elasticity of these; and,

A *Muscular Coat*, placed between the Cartilages and in the back part of the Trachea, and composed of Circular Fibres without, and Longitudinal Fibres within;—the former for straitening, the latter for shortening the general Passage. Tab. LXXX. Fig. 9: Fig. 8.

The Longitudinal Fibres are collected into Bundles, which are distinctly seen through the inner Coat, and may be traced considerably farther, in the substance of the

the Lungs, than the Cartilages. Tab. LXXX. Fig. 9. *f*.

The inner side of the Trachea is lined with a very *Vascular and irritable Membrane*, continued from the Mouth, and forming at last the extreme Branches of the Trachea, which terminate in the Cells of the Lungs.

The inner Membrane of the Trachea is every where perforated by the *Ducts* of *Mucous Glands*, and by the *Mouths* of the *Exhalent Arteries*, the former pouring out Mucus to lubricate the Lungs, the latter the Vapour which is thrown off in Perspiration.

Three different kinds of Glands are connected with the Trachea,—the *Thyroid*, the *Tracheal*, and the *Bronchial*.

The *Thyroid Gland* has its name from its connection with the Thyroid Cartilage, though more immediately connected with the Trachea.

It is a large reddish Mass, situated at the under and fore part of the Larynx, behind the Sterno-hyoidei and Sterno-thyroidei. Tab. LXXX. Fig. 8. *n*.

It has two Lobes placed at the under and lateral parts of the Larynx, descending a certain way upon the Trachea and Esophagus.

The Lobes are joined by an intermediate portion, which lies across the upper and fore part of the Trachea. Tab. LXXX. Fig. 3. *n*.

Sometimes a Process from the middle portion, which may be mistaken for a Muscle, ascends between the Sterno-hyoidei, and is fixed to the Base of the Os Hyoides. Tab. LXXX. Fig. 8. *p*.

This Gland has a Granulous appearance within, and a viscid Liquor is sometimes observed in it, which has been supposed by SABATIER and others, to lubricate the parts in the neighbourhood.

It is supplied with large Blood-vessels, and with several Nerves, from those of the Larynx. It is likewise furnished with numerous Lymphatics.—But no Excretory Duct has yet been observed to come from it; nor is its office yet understood.

The *Tracheal Glands* are small, but numerous, and of different sizes, surrounding the Muscular Coat of the Trachea, and its Branches in the Lungs;—the largest of them are placed in the Flethy Substance behind. Tab. LXXX. Fig. 9. *n*.

From each of these Glands a small Duct issues, and throws out a Mucus, to defend the inner Surface of the Trachea from being injured by the Air, or by the extraneous particles which it carries along with it.

The *Bronchial Glands* are placed in the Cellular Substance round the under end of the Trachea and roots of the Bronchi, where these penetrate into the Substance of the Lungs.

They are of various sizes, from that of the point of the Little Finger to that of a Millet-seed, and have a bluish or dark colour, corresponding in a great measure with the colour of the darkest parts of the Lungs.

They were formerly considered by many Authors as sending Fluids to the Trachea, but are now sufficiently known to be entirely of the Lymphatic kind,—the Ab-

sorbents of the Lungs passing through them in their way to the Thoracic Duct.

The Trachea is furnished with *Blood-vessels* from the Inferior Laryngeals, and *Nerves* from the Recurrent and Great Sympathetic Pair.

The Trachea serves to convey Air into, or out from the Cells of the Lungs, during Respiration, and to carry off the Perspirable Matter from the Arteries in the time of Expiration.

The *Blood-vessels* of the Lungs consist of the *Pulmonary* and *Bronchial Vessels*; the one for the general Circulation, the other proper to the Lungs.

The Pulmonary Artery arises from the top of the Right Ventricle, divides, like the Trachea, into Right and Left Branches, which are dispersed through the substance of the Lungs. Tab. LXXXV. *d*,—*b*. Tab. LXXXIII. Fig. 1. D, E, F.

The minute Branches running in the common Cellular Substance, form at last a *Plexus* upon the proper Cells, sometimes called *Rete Mirabile*, and *Rete Vasculosum MALPIGHII*, from which that Halitus is derived which is expelled by the Lungs in Expiration.

The *Pulmonary Veins* are commonly observed to be smaller, in proportion to the corresponding Arteries, than Veins are to Arteries in other parts of the Body, which has been supposed to be owing to the large quantity of Fluids expired.—They join into four principal Trunks, which terminate in the Left Auricle. Tab. LXXXIII. Fig. 1. G—K. Tab. LXXXV. *i*, *i*.

The *Bronchial Arteries* arise by three or four small Branches; one of which is from one of the right Superior Intercostals, the rest from the Trunk of the Aorta.

They are dispersed upon the Bronchi and Bronchial Glands, and the substance of the Lungs in general, and are found to communicate with the Pulmonary Artery.

The Bronchial Arteries are supposed to serve for the nourishment of the Lungs and secretion of the Mucus.

The *Veins* return the Blood to the Vena Azygos, and Left Superior Intercostal Vein.

The *Lymphatics* form a Plexus upon the Surface of the Lungs:—They communicate freely with the deep-seated Absorbents, and pass through the Bronchial Glands.

The *Nerves* of the Lungs are partly from the Great Sympathetics, chiefly from the Eighth Pair, and are rather small in proportion to the bulk of the Organ on which they are dispersed.

The Lungs serve the general purpose of *Respiration*, which consists of *Inspiration* and *Expiration*, or the passage of the Air into or out from the Lungs by the alternate dilatation and contraction of the Thorax.

Inspiration is performed in consequence of the Thorax being dilated by the action chiefly of the Diaphragm and Intercostals; the Lungs, which are passive, and in contact with the Thorax, following it, and the Air rushing into the Trachea by its own gravity.

Expiration is performed in consequence of a relaxation of the Muscles which dilate the Thorax,—of the action

action of the Abdominalis and a few other Muscles,—of the elasticity of the Cartilages of the Ribs, and likewise of the Lungs, by which the Cavity of the Thorax is diminished, and the Air is expelled from the Lungs.

Upon the alternate states of Inspiration and Expiration, depend the formation of the Voice, the sensation of Smell, and all the other Functions of the Body:—But the great and principal office of the Lungs, which was formerly supposed to be that of cooling the Blood over-heated by Friction, is, during Inspiration, to receive from the Atmosphere pure Air, upon which the principle of heat and life depends; and, during Expiration, to carry off an impure Air, which is noxious to Life.

According to late Experiments, it appears,—that the Venous Blood passing to the Lungs, of a dark red or purple colour, is charged with Carbon and Hydrogen; that, while circulating upon the Bronchial Cells, one part of the Oxygen, contained in the common Air which has been inspired, unites with the Carbon and Hydrogen, and forms fixed Air and a Watery Halitus, which are carried off by Expiration;—that another part of the Oxygen is imbibed by the Blood, which, in consequence of these changes, returns from the Lungs, of a florid red colour, and full of Heat in a latent state, which becomes sensible in the course of the general Circulation, and is diffused over the different parts of the Body; and,—that the Blood thus changed also affords a Stimulus to the Arteries, and promotes the different Secretions.

ESOPHAGUS.

The ESOPHAGUS, called also *Gula* or *Gullet*, derives its name from carrying what is eaten into the Stomach.

It is a *Fleshy Canal*, which begins from the Inferior part of the Pharynx, descends along the Neck, and through the Thorax, following nearly the direction of the Spine. Tab. XLVII. Fig. 6. *b.* Tab. CXCII. T.

It is situated between the Trachea and Vertebrae; and in the Thorax, it proceeds behind the Base of the Heart, and between the Layers of the Posterior Mediastinum, from which it receives a lateral covering.

Soon after entering the Thorax, it makes a slight turn to the right, and passes down upon the fore and right side of the Aorta, by which the Artery and it are prevented from injuring each other.

In its progress, it inclines more forwards and to the left side; and about the Ninth Dorsal Vertebra, it perforates the Muscular part of the Diaphragm, and terminates in the upper Orifice of the Stomach. Tab. CXXX. Fig. 2. A, D.

It has several *Coats* proper to it, the first of which is *Cellular*, and connects it to the adjacent parts.

The second Coat is *Muscular*, and is sometimes termed *Vaginalis Gulae*.—It consists of two Layers; the external

of which has thick, strong, longitudinal Fibres; the internal is formed of circular and transverse Fibres, and is thinner than the former.—The outer Layer is fitted for shortening and relaxing, and the inner for contracting the Canal, during Deglutition. Tab. CXXX. Fig. 2. D, C.

The third Coat is termed *Nervous*, but is properly *Cellular*, being formed of loose Cellular Substance, which connects the Muscular to the inner Coat.

The *inner Coat* is continued from the lining of the Mouth: It consists of many longitudinal *Plicae*, which are scarcely visible when the Esophagus is dilated, and is furnished with numerous Foramina, which discharge a Mucus, for lubricating the Passage, and facilitating Deglutition.

The *Arteries* of the Esophagus are Branches of the Inferior Laryngeals, which supply the Cervical part of it, and Esophageals and Branches of the Bronchials, which are derived from the Aorta Descendens, and supply the Thoracic part of it.

The *Veins* go to the Inferior Laryngeals, to the Vena Azygos, and to the left superior Intercoastal Vein.

The *Absorbents* are numerous, and intermix with those of the Heart and Lungs.

The *Nerves* are chiefly from the Eighth Pair.

The Esophagus receives the Aliments from the Pharynx, and conveys them to the Stomach.

THORACIC DUCT.

The THORACIC DUCT is a small Membranous-like Canal, situated in the back part of the Thorax, and is the principal Trunk of the Absorbent System.

It begins upon the third Vertebra of the Loins, and passes behind the Aorta, crossing obliquely from left to right, till it gets to the right side of that Artery.

Upon the first Lumbar Vertebra, it forms an *Oval Sac*, termed *Receptaculum Chyli*, which is placed behind the Right Crus of the Diaphragm, and a little higher than the Right Renal Artery. Tab. CLXIV. C.

The Duct afterwards passes between the Crura of the Diaphragm, and ascends in the Thorax, on the anterior part of the Spine, between the Layers of the Posterior Mediastinum, on the right side of the Aorta, and between it and the Vena Azygos. Tab. CLXXIV. Fig. 1. *u, u.*

It crosses behind the upper part of the descending Aorta, and emerges from the Thorax, to reach the under part of the left side of the Neck.

In the Neck, it passes behind the Internal Jugular Vein, and a little higher than the Subclavian.

It then turns downwards, forming an Arch, which terminates in the upper part of the Angle, between the Internal Jugular and Subclavian of the Left Side.

The Thoracic Duct receives the Chyle from the Lacteals, and Lymph from the Lymphatics, and discharges these into the red Veins.

TABLE.

T A B L E LXXXI.

The INTEGUMENTS cut and turned back, and some of the RIBS of the LEFT SIDE removed ; to shew part of the CONTENTS of the THORAX and ABDOMEN.

- | | |
|--|--|
| A, The trachea. | K, The umbilicus, to which the umbilical vessels and urachus, now changed into ligaments, are connected. |
| B, B, The sternum. | L, L, The right and left lobes of the liver. |
| C, The pectoralis major. | M, The suspensory ligament. |
| D, The right mamma. | N, The stomach. |
| E, E, A section of the uppermost ribs of the left side. | O, O, The omentum majus, through which the arch of the colon appears. |
| F, Part of the surface of the heart, exposed by laying open, | P, P, The convolutions of the intestines. |
| G, G, The pericardium. | Q, Q, The containing parts of the abdomen folded back, |
| H, H, The left lung. | |
| I, The upper surface of the diaphragm. | |

T A B L E



FIG. 1. TAB. 82.

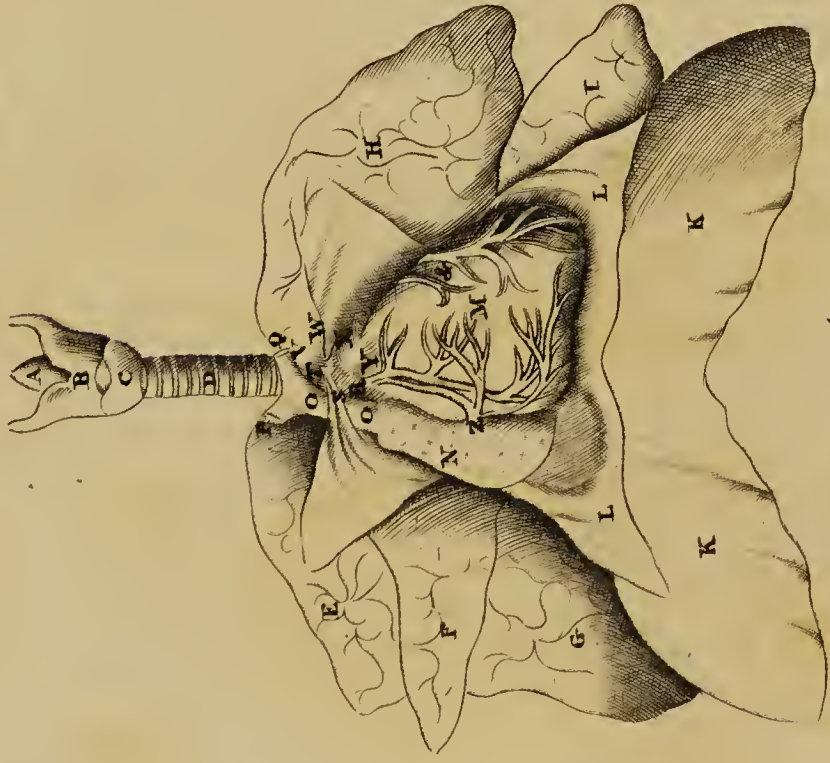


FIG. 2.

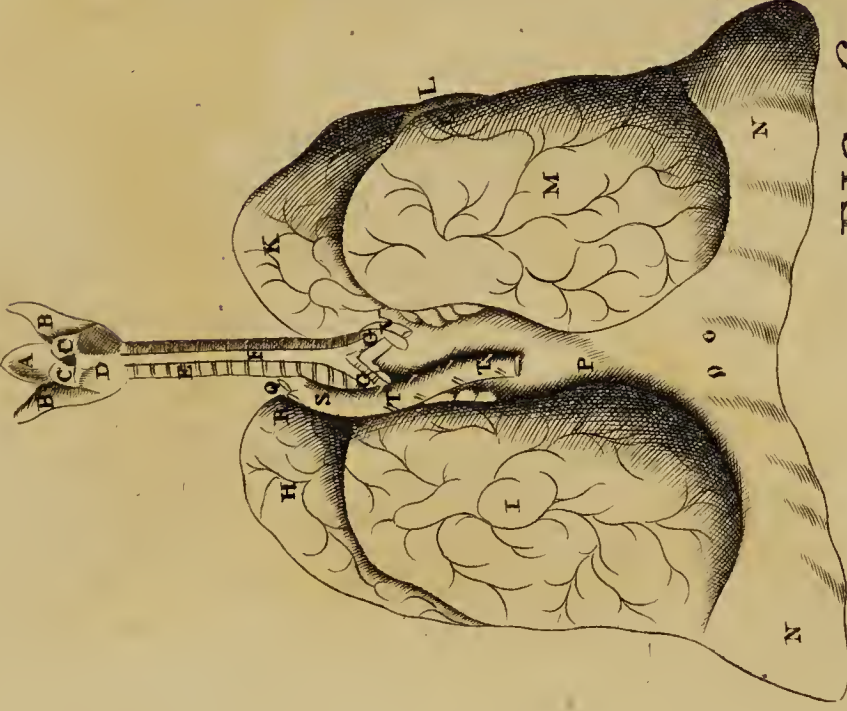


FIG. 3.

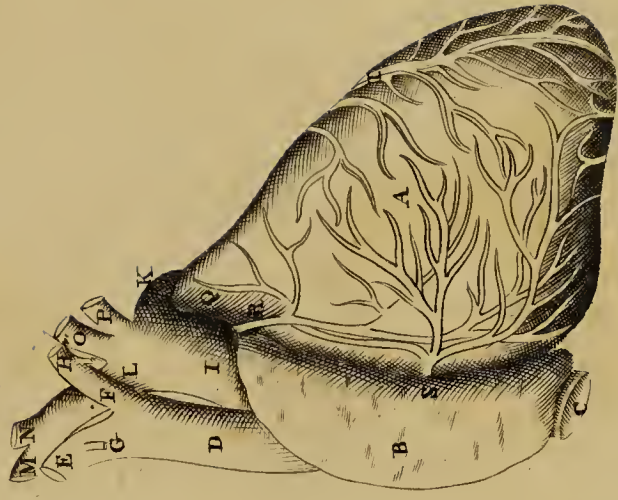


FIG. 4.



FIG. 5.

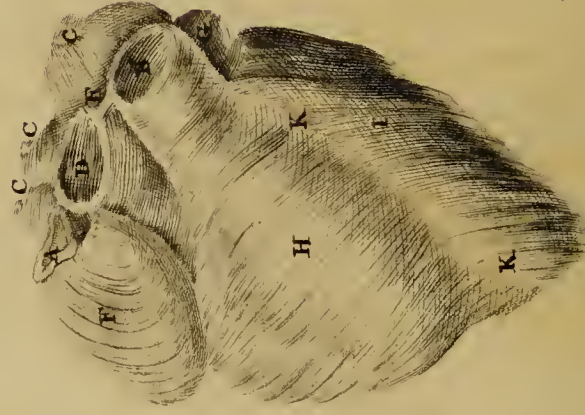


FIG. 6.

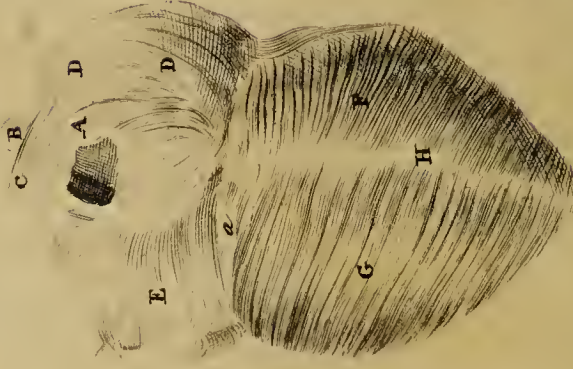


FIG. 7.

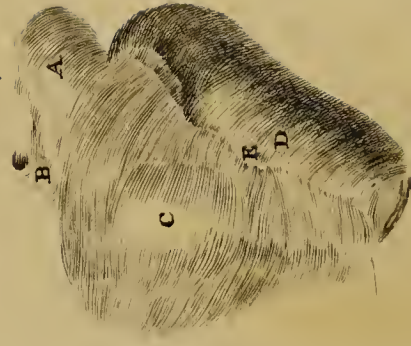


FIG. 8.



FIG. 9.



FIG. 10.



FIG. 11.



FIG. 12.



FIG. 13.

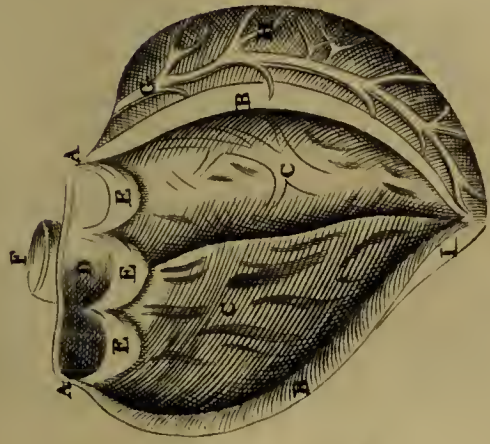


FIG. 14.



FIG. 15.

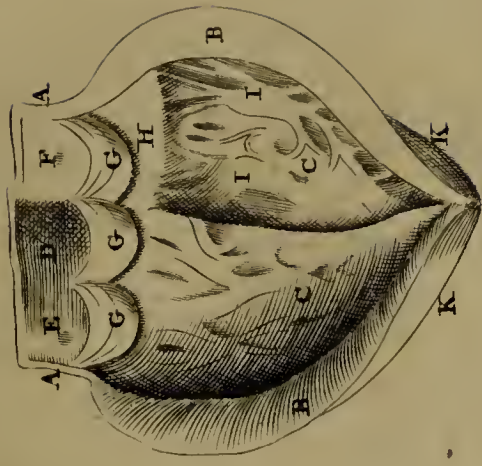


FIG. 16.

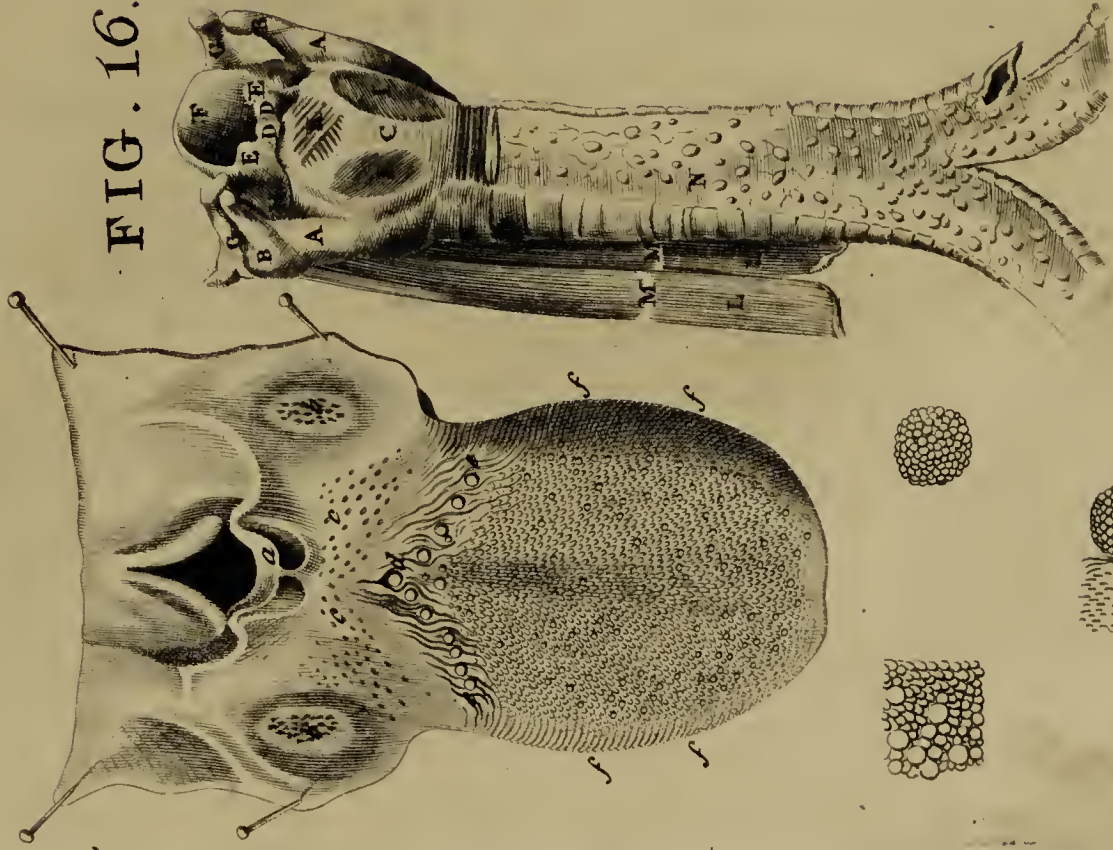


FIG. 17.

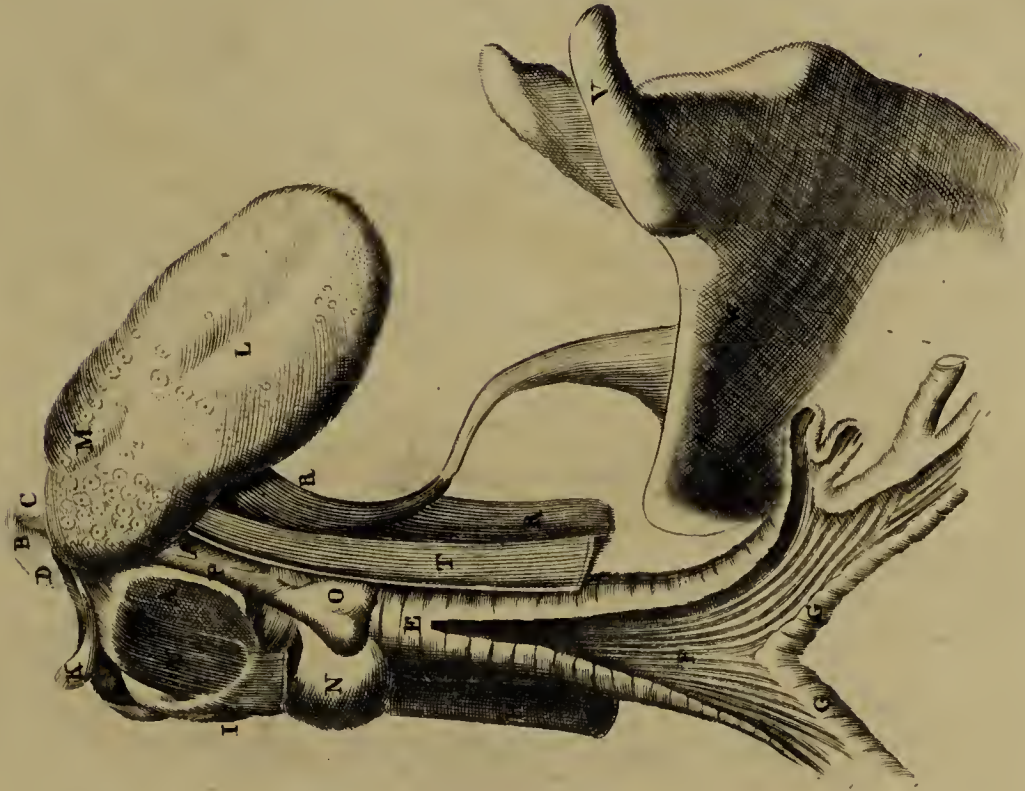


FIG. 18.

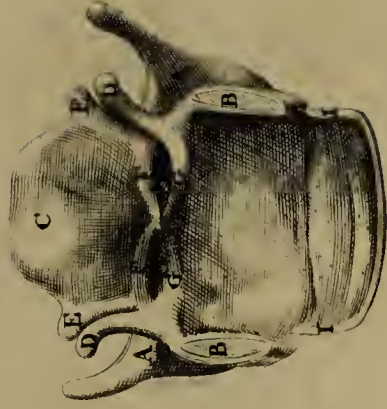


FIG. 19.



T A B L E LXXXII.

VIEWS of the THORACIC VISCERA.

FIG. 1.

The LARYNX, TRACHEA, and THORACIC VISCERA, removed from the BODY, and viewed Anteriorly.

- A, B, C, The larynx.
 A, The epiglottis.
 B, The thyroid cartilage.
 C, The cricoid cartilage.
 D, The trachea.
 E, F, G, H, I, The lungs turned back.
 E, F, G, The three lobes of the right side.
 H, I, The two lobes of the left side.
 K, K, The diaphragm cut from the thorax.
 L, L, The pericardium cut in a crucial direction, and the angles turned back.—The upper angles not lettered.
 M, The right ventricle of the heart.
 N, The right auricle.
 O, O, The vena cava superior.
 P, Q, The subclavian veins.
 R, The aorta.
 S, The pericardium adhering to the aorta.
 T, The situation of the trunk common to the right subclavian and right carotid arteries.
 V, The situation of the left carotid artery.
 W, That of the subclavian artery.
 X, The pulmonary artery.
 Y, The right coronary artery.
 Z, One of the coronary veins.
 &, The left coronary artery and vein: The coronary vessels in this, as well as in the other Figures of this Table in which they are represented, are beyond the proportional size.

FIG. 2.

A Posterior View of the PARTS represented in the former Figure.

- A, B, B, C, C, D, The larynx.
 A, The epiglottis.
 B, B, The thyroid cartilage.
 C, C, The arytenoid cartilages.
 D, The cricoid cartilage.
 E, The trachea;
 F, Its membranous and fleshy part.
 G, G, The bronchi, also membranous and fleshy behind.

- H, I, The lobes of the left, and;
 K, L, M, The lobes of the right lung.
 N, N, The diaphragm.
 O, The foramen through which the esophagus passes to the stomach.
 P, The pericardium, containing the heart.
 Q, The left carotid artery.
 R, The left subclavian artery.
 S, The aorta, which turns over the left branch of the trachea, and sends off,
 T, T, The intercostal arteries.
 V, The vena azygos, which bends over the right branch of the trachea.

FIG. 3.

An Anterior View of the HEART and Large VESSELS.

- A, The right ventricle of the heart.
 B, The right auricle.
 C, The vena cava inferior, cut across close to the right auricle.
 D, The vena cava superior.
 E, F, The subclavian veins.
 G, H, The internal mammary veins.
 I, K, The aorta;—K, its arch.
 L, The root of the aorta, common to,
 M, The right subclavian, and,
 N, The right carotid artery.
 O, The left carotid artery.
 P, The left subclavian artery.
 Q, The pulmonary artery.
 R, The right, or small coronary artery, arising from the aorta, and passing between the right auricle and pulmonary artery.
 S, The right, or small coronary vein terminating in the right auricle. The right and left coronary vessels are seen running chiefly upon the right ventricle, and below, turning round towards the posterior surface of the heart.
 T, The left coronary vessels.

FIG. 4.

The same HEART viewed Posteriorly.

- A, The left ventricle.
 B, ——— auricle.

Q 2

C, The

- C, The right auricle.
 D, The inferior cava, divided near the right auricle.
 E, , The superior cava.
 G, The vena azygos.
 H, H, The venæ subclaviæ.
 K, L, M, The aorta ;—L, its arch.
 N, The common root of the right subclavian and right carotid.
 O, The right subclavian.
 P, ——— carotid.
 Q, The left subclavian.
 R, ——— carotid.
 S, The trunk of the pulmonary artery.
 T, V, The two great branches of the pulmonary artery.
 W, A section of the left, or pulmonary sinus.
 X, The left, or great coronary artery, arising from the aorta, and running between the pulmonary artery and left auricle.
 Y, The great coronary vein, represented in this Figure, terminating in the inferior cava. Upon the surface of the heart in general are seen, the principal branches of the coronary artery and vein, which, after supplying this side of the heart, turn round to communicate with the vessels represented in Fig. 3.

FIG. 5.

An Anterior View of the HEART, to shew its MUSCULAR STRUCTURE, and the Obliquity of the MUSCULAR FIBRES.

- A, The vena cava.
 B, A section of the pulmonary artery.
 C, C, C, The pulmonary veins tied.
 D, A section of the aorta.
 E, What was the ductus arteriosus in the fœtus, now changed into ligament.
 F, The right auricle distended, to shew the series of its muscular fibres.
 G, The left auricle.
 H, The oblique descending progress of the fleshy fibres of the right ventricle.
 I, The oblique ascending progress of the fibres of the left ventricle.
 K, K, The tendinous union of the two sets of fibres in the septum of the heart.

FIG. 6.

A View of the Posterior SURFACE of the HEART.

- A, The termination of the inferior cava in the right auricle.
 B, Part of the superior cava.
 a, The vena coronaria.
 C, The vena azygos, tied at its termination in the superior cava.
 D, D, The right auricle, representing the various dispositions of its fibres.
 E, The muscular fibres of the left sinus venosus.
 F, The fibres of the right ventricle.
 G, Those of the left ventricle.
 H, Their tendinous union in the septum.

FIG. 7.

The Series of FIBRES under those represented in Fig. 5.

- A, Part of the pulmonary artery.
 B, Part of the aorta.
 C, The fibres of the right,
 D, Those of the left ventricle.
 E, The tendinous union of the fibres of both ventricles.

FIG. 8.

The MUSCULAR FIBRES as they appear under those of Fig. 6.

- A, Part of the aorta.
 B, The tendinous union of the fibres of both ventricles.

FIG. 9.

The Double Spiral Order of the FIBRES at the APEX of the HEART, which may partly be seen in Fig. 7.

- A, Part of the arteria pulmonalis.
 B, The contortion of the fibres at the apex of the heart.
 C, The tendinous union of both ventricles.

FIG. 10.

A View of the Inner SURFACE of the CONE of the HEART, seen in the last Figure.

- A, The point of the right ventricle,
 B, That of the left.
 C, The thickness of the sides of the right ventricle,
 D, D, That of the left.
 E, A thread supporting the tendinous fibres which pass from one side of the left ventricle to the other.
 F, The trunk of the coronary artery and vein divided.
 G, The tendinous union of both ventricles.

FIG. 11.

The Right AURICLE and VENTRICLE, cut longitudinally, to shew their INTERNAL SURFACE.

- A, The outer, and,
 B, The inner surface of the right auricle.
 C, C, The cut edge of the right auricle and superior vena cava.
 D, D, The inner surface of the right sinus venosus, without columnæ.
 E, The orifice of the superior cava.
 F, The Valve of EUSTACHIUS, reticular in this Figure.
 G, The orifice of the vena coronaria major, with its semilunar valve.
 H, The vestige of the foramen ovale.
 I, I, The cut edge of the right ventricle.
 K, K, The opening between the right auricle and ventricle.
 L, L, M, M, The valvula tricuspid ;—M, M, A portion of it split down the middle.
 N, N, N, Tendinous cords continued from the valvula tricuspid.
 O, O, The columnæ carneæ of the right ventricle, forming plexuses, and running in various directions.
 P, The

- P, The outer surface of the right ventricle.
 Q, The pulmonary artery.
 R, The aorta.
 S, The principal branch of the vena coronaria major.

FIG. 12.

The Right AURICLE and VENTRICLE laid open.

- A, The left side of the heart and its blood-vessels filled with wax.
 a, The apex of the heart.
 B, B, The inferior, and,
 C, The superior cava laid open.
 b, The right sinus venosus.
 D, The right auricle, with its columnæ carneæ.
 E, The EUSTACHIAN valve at the mouth of the inferior cava.
 F, F, The sides of the right ventricle divided.
 G, One of the columnæ carneæ, to which the tricuspid valve is fixed.
 H, The valvula tricuspidis.
 I, The valve at the orifice of the great coronary vein.
 K, A probe passed through the foramen ovale, which, in this, an adult subject, was opened.—The probe leads into,
 L, The left sinus venosus.
 M, A probe supporting the tricuspid valve.
 N, The right branch of the pulmonary artery.
 O, The left branch of that artery.
 P, Fleishy fibres passing between the septum cordis and opposite side of the right ventricle.

FIG. 13.

The HEART, with the PULMONARY ARTERY and Right VENTRICLE, cut Longitudinally near the Left VENTRICLE, and spread out.

- A, A, The cut edges of the pulmonary artery.
 B, B, The cut edges of the right ventricle.
 C, C, The inside of the ventricle, in which the columnæ carneæ are slightly represented.
 D, The inside of the pulmonary vein.
 E, E, E, The three semilunar valves placed at the mouth of the artery.
 F, The aorta.
 G, The ramus major of the great coronary vein.
 H, The exterior surface of the left, and,
 I, That of the right ventricle.

FIG. 14.

The Left SINUS VENOSUS and VENTRICLE laid open by a Longitudinal Incision.

- A, The left auricle.
 B, The cut edge of the left sinus.
 C, C, The inner surface of the sinus.
 D, The finulus lunatus, formed by the vestige of the foramen ovale.
 E, E, The cut edge of the left ventricle.
 F, F, The passage between the auricle and ventricle.

- G, G, G, The valvula mitralis.
 H, That part of the valve which is before the mouth of the aorta.
 I, I, The columnæ carneæ, from which the tendons arise which are fixed to the edges of the valvula mitralis.
 K, Other columnæ carneæ within the ventricle.
 L, L, The outer surface of the ventricle.

FIG. 15.

The Left VENTRICLE, and beginning of the AORTA, laid open by a Longitudinal Incision.

- A, A, The cut edge of the aorta.
 B, B, ————— ventricle.
 C, C, The inner surface of the ventricle, with traces of the columnæ carneæ.
 D, The inside of the aorta.
 E, The orifice of the right, and,
 F, The orifice of the left coronary artery.
 G, G, G, The three semilunar valves in the mouth of the aorta.
 H, The valvula mitralis.
 I, I, The columnæ carneæ, from which tendons run to the edges of this valve.
 K, K, The outer surface of the ventricle.

FIG. 16.

A Back-view of the LARYNX, TRACHEA, and some of the MUSCLES of the LARYNX.—See Tab. LIII. Fig. 8.

FIG. 17.

Exhibits the TONGUE, LARYNX, Part of the ESOPHAGUS, and SCAPULA.—See Tab. LXXX. Fig. 8.

- V, The coracoid process, and,
 W, The upper part of the scapula.

FIG. 18.

The LARYNX, cut Longitudinally behind, and stretched back, to skew,

- A, A, The thyroid cartilage.
 B, B, The cricoid cartilage.
 C, The epiglottis.
 D, D, The arytenoid cartilages.
 E, E, The long crura of the arytenoid glands.
 F, F, The superior, and,
 G, G, The inferior ligaments of the glottis.
 H, H, The ventricles of the larynx.
 I, I, The first cartilages of the trachea.

FIG. 19.

Represents the ARTICULATION of the ARYTENOID with the CRICOID CARTILAGE, also one of the ARYTENOID GLANDS, &c.

- a, A right longitudinal section of the cricoid cartilage, viewed anteriorly.
 b, The right arytenoid cartilage, inclined outwards and backwards.

c, d, Its

- c, d*, Its articulation with the cricoid cartilage.
e, The superior, and,
f, The inferior processes of the right arytenoid cartilage.
g, The cavity in the anterior surface of the arytenoid cartilage, in which is situated,
h, The arytenoid gland, which is here represented detached.
k, Represents the shape and size of the left ventricle of the larynx.

FIG. 20.

The TONGUE of a Child two years old, the ARTERIES of which were injected with Wax.

- a*, The epiglottis.
b, b, The tonsils.
c, c, Mucous follicles, seen at the root of the tongue.
d, The foramen cæcum.
e, The papillæ maximæ.

The papillæ mediæ and minimæ are seen upon the upper surface of the tongue, extending from the papillæ maximæ as far as the apex linguæ.
f, f, The papillæ striatæ, seu lineares.

FIG. 21.

The Left PART of the Upper Side of the Point of the TONGUE magnified, to shew the PAPILLÆ MEDIÆ and MINIMÆ.

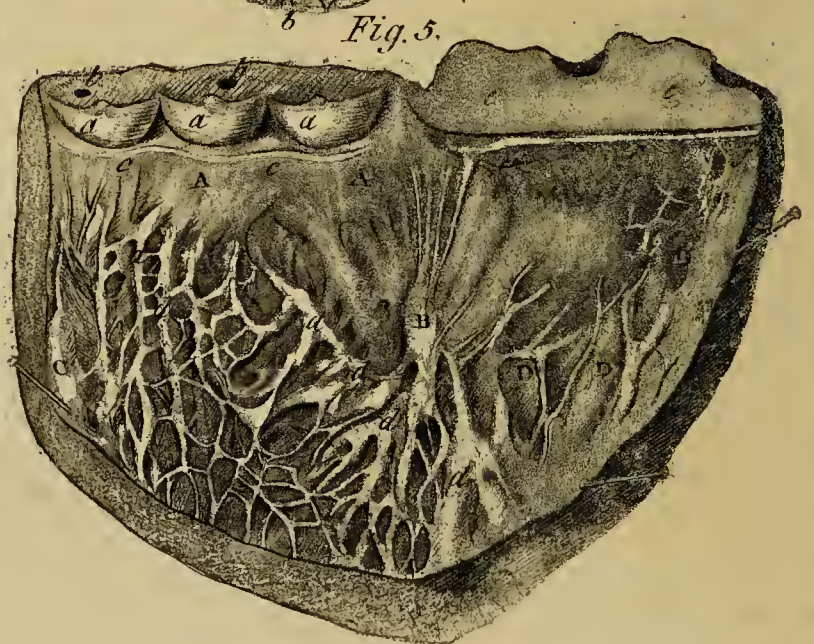
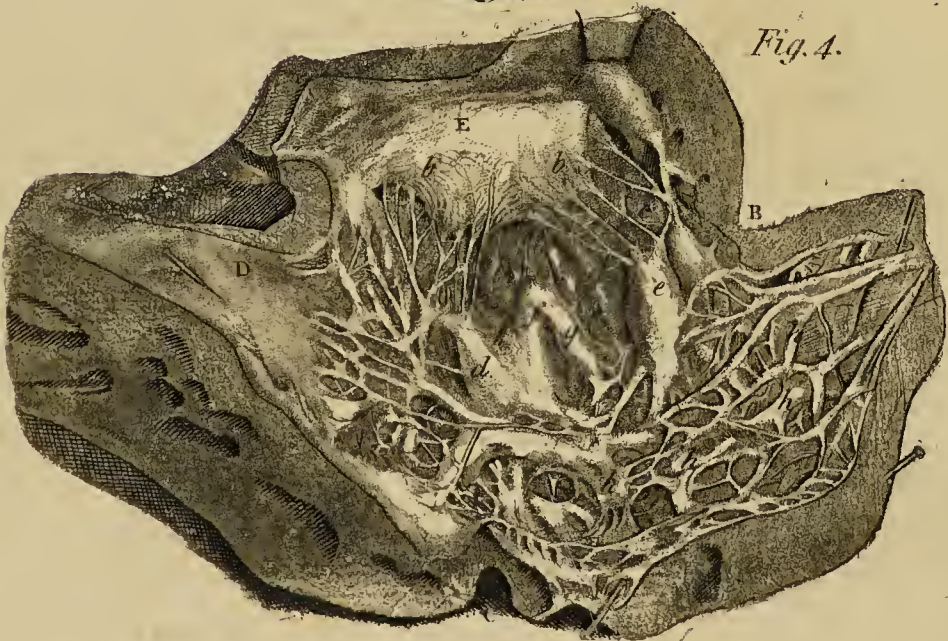
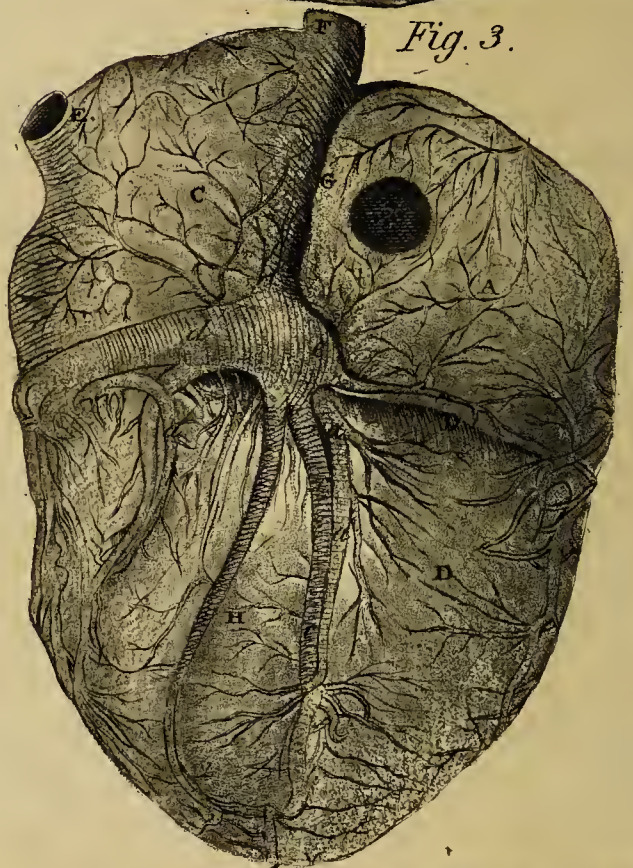
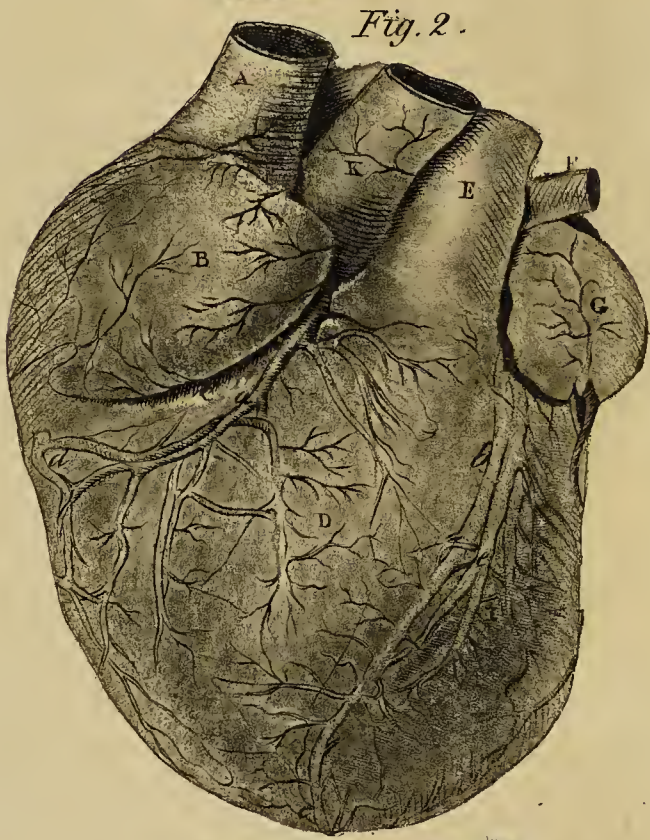
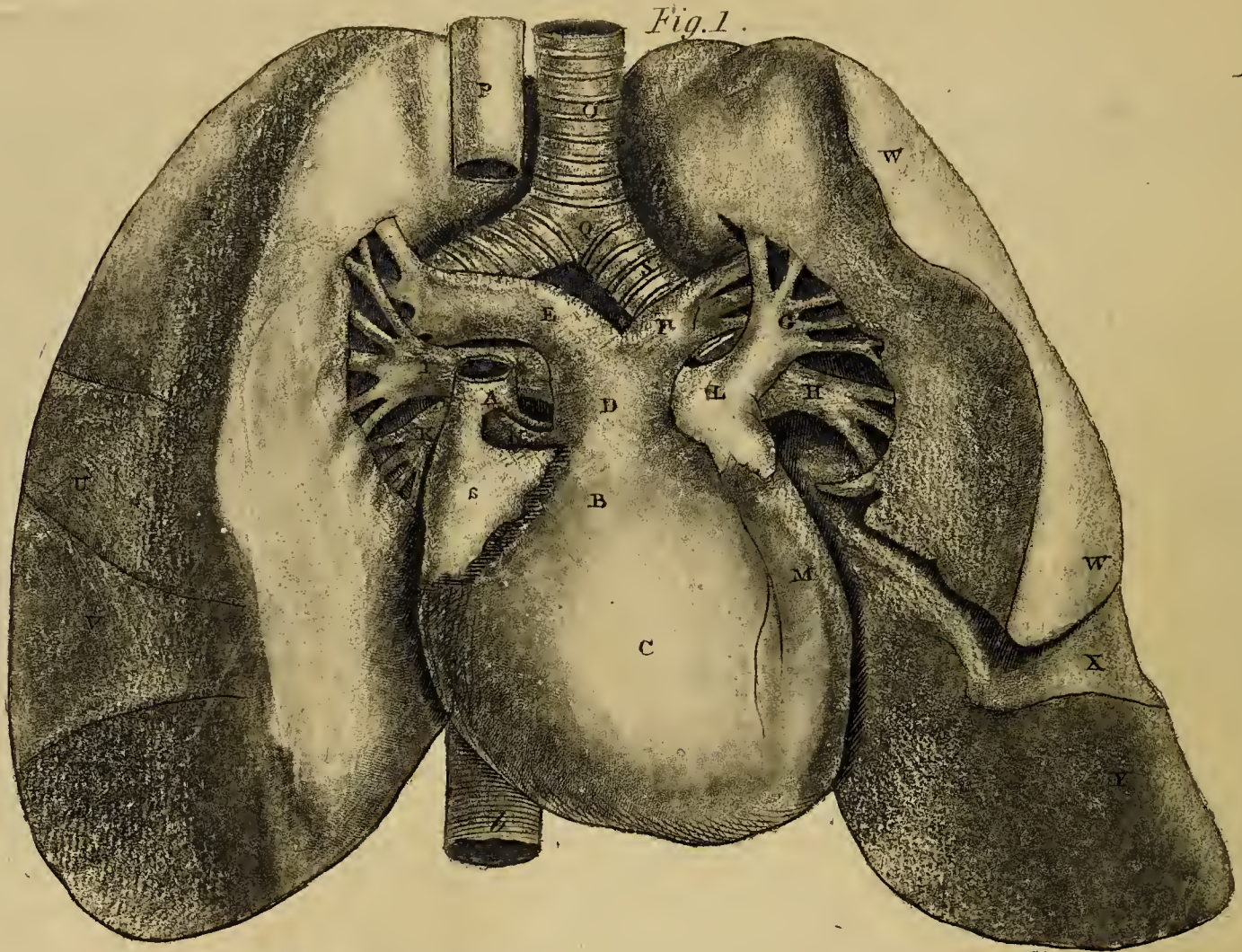
FIG. 22.

The VERTEX of one of the PAPILLÆ FUNGIFORMES viewed in a Microscope, to shew the Tuberculous appearance.

FIG. 23.

The same PAPILLA viewed Laterally; shewing the STAMINA which compose it, with Vessels which adhere to them.

TABLE



T A B L E LXXXIII.

Different VIEWS of the HEART and LUNGS.

FIG. 1.

Represents the HEART attached to the LUNGS by the large BLOOD-VESSELS.

- A, The vena cava superior.
- b, ————— inferior.
- a, The right auricle, or appendix of the heart.
- B, C, The right ventricle of the heart.
- D, The pulmonary artery, which is here very short in proportion to its diameter.
- E, The right branch of the pulmonary artery.
- F, The left branch, which is very short, and not so thick as the right.
- G, The left anterior, and,
- H, The left posterior pulmonary vein.
- I, The right anterior, and,
- K, The right posterior pulmonary vein.
- L, The left auricle, or appendix of the heart.
- M, The left ventricle of the heart.
- N, A section of the aorta.
- O, The trachea, proportionally small.
- P, The vena cava superior, cut and raised, to shew the pulmonary vessels.—It is represented too large.
- Q, The angle of the trachea arteria, a little to the right side of that of the pulmonary artery.
- R, The right branch of the trachea, a little thicker than the left.
- S, The left branch of the trachea.
- T, U, V, The three lobes of the right lung represented in shade, and folded in as far as the commencement of the light.
- W, W, X, Y, The two lobes of the left lung.—W, W, The upper lobe, the edge of which is folded in as far as the dark shade.—X, Y, The inferior lobe.

FIG. 2.

The CAVITIES of the HEART Injected.—The exact proportions of the VESSELS have not been preserved, various degrees of force having been applied in the Injection.

- A, The vena cava superior.
- B, The right auricle injected;—the indented appearance of its edges effaced by the injection.

- C, The groove opposite the opening of the right auricle into the right ventricle.
- D, The right ventricle.
- E, The pulmonary artery.
- F, The anterior pulmonary vein.
- G, The left auricle, which is more elevated than the right.
- H, The groove opposite the opening of the left auricle into the left ventricle.
- I, The left ventricle.
- K, The aorta, which rises behind the pulmonary artery, and becomes curved in its descent.
- a, The right coronary artery.
- b, The anterior branch of the left coronary artery.
- c, The anterior branch of the coronary artery, which passes over the posterior part of the apex of the heart.
- d, The venæ innominatæ, which open into the auricle with their trunk.
- e, The vein which accompanies the coronary artery.

FIG. 3.

A View of the Posterior and Under, or Flat SURFACE of the HEART, the CAVITIES of which are Injected. The CORONARY VESSELS are also filled: The TRUNK of the CORONARY VEIN has been forced by the Injection.

- A, The right auricular sac, shorter than the left.
- B, The orifice of the vena cava inferior.
- C, The left auricle.
- D, D, The uppermost D points out the groove opposite the opening of the auricle into the ventricle. The undermost D points out the extremities of the small arteries, which are spread transversely over the right ventricle.
- E, F, The termination of the left and right posterior pulmonary veins in the left auricle.
- G, The septum or partition of the two auricular sacs.
- H, The left ventricle.
- a, a, a, Branches of the coronary arteries.
- b, The coronary artery, which comes from the opposite surface of the heart.
- c, c, The vein which runs along the septum of the ventricles.

d, The

- d*, The trunk, or sinus of the coronary vein, distended by the injection.
e, The entrance of the coronary sinus into the right ventricle.

FIG. 4.

The Inner SURFACE of the Left VENTRICLE. The AORTA has been divided, and pushed to a distance from the SEPTUM.

- A*, An incision necessary for extending the ventricle, and bringing it into view.
B, A second incision for the same purpose.
C, A third incision, made at the apex of the ventricle.
D, The smooth space under the aorta.
E, The large portion of the mitral valve, which considerably surpasses that hid underneath.
a, A tendinous cord to which the mitral valve is attached.
b, b, Tendinous filaments which creep along the valve, and which go to join those which come from the root of this valve.
c, c, The posterior pillars, some of which divide the filaments of the smaller portion of the valve.
d, e, f, g, The pillars from which the tendinous fibres go off.

- b, b, b, b*, The columnæ carneæ and small fossæ, with which the inner side of the ventricle is covered.

FIG. 5.

The Left VENTRICLE and MOUTH of the AORTA laid open, to shew the COLUMNÆ CARNEÆ and SEMILUNAR VALVES;—the greater part of the VALVULA MITRALIS being removed.

- A, A*, The smooth space under the aorta.
B, The pillar, with its tendinous filaments which go to the remainder of the mitral valve.
C, Another pillar, with some tendinous filaments which also go to the remainder of the valve.
D, D, D, What is deficient here has been represented in Fig. 4.
a, a, a, The semilunar valves, with their *Corpuscula AURANTII*.
b, b, Orifices of the coronary arteries.
c, c, The cord under the sigmoid valves.
d, d, &c. The columnæ carneæ, with their pits or fossæ.
e, e, The cord of the mitral valve, seen a little below the letters.
f, f, f, The insertion of the fibres of the columns under the cord of the mitral valve.

TABLE

TAB. 84.

Fig. 1.

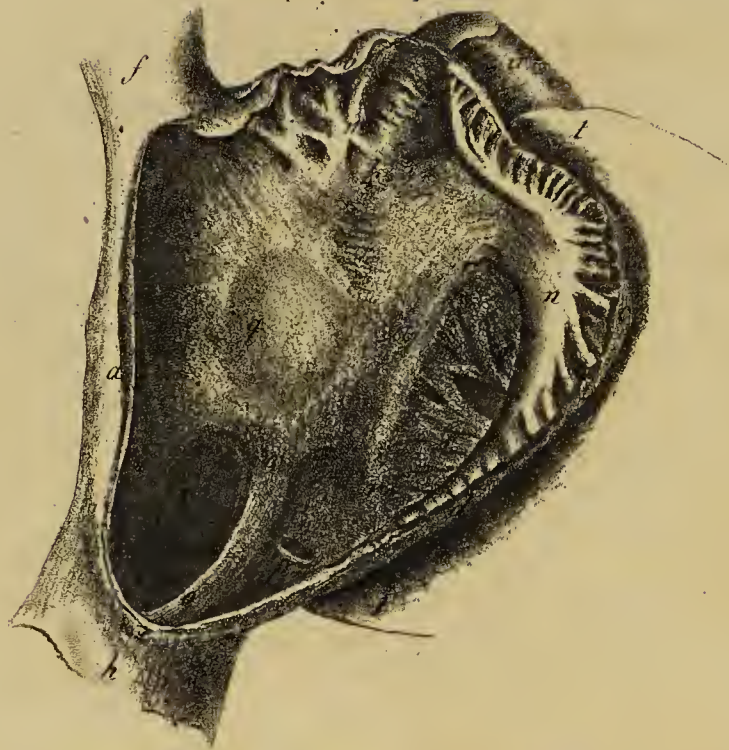
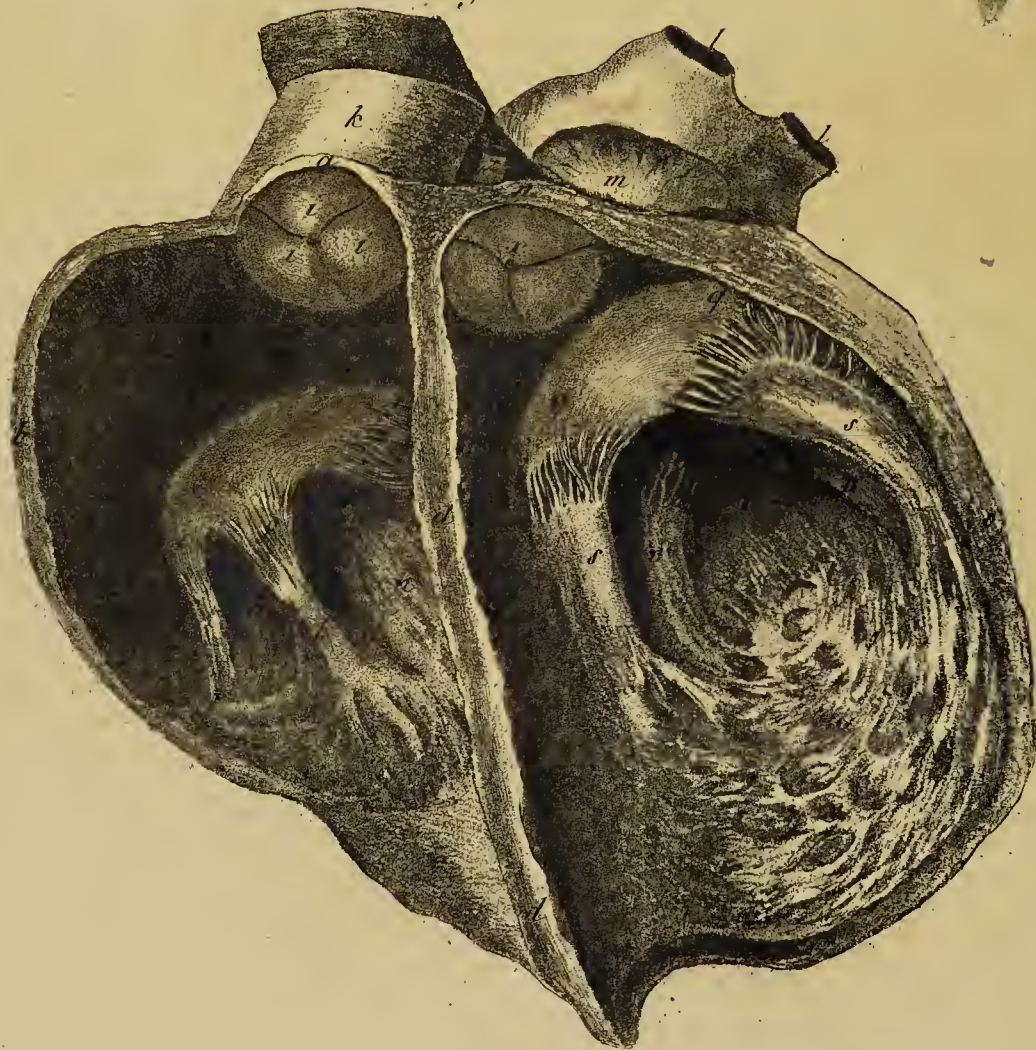


Fig. 2.



Fig. 3.



A. F. scit

T A B L E LXXXIV.

Represents the CAVITIES of the HEART laid open, to shew its INTERNAL STRUCTURE.

FIG. 1.

A View of the CAVITY of the RIGHT AURICLE, laid open Anteriorly.

- a, b, c, d, e*, The cut edge of the right auricle.
f, The vena cava superior.
g, The termination of this vein in the right auricle.
h, i, The vena cava inferior;—*i*, its mouth.
k, The boundary between the right venous sinus and proper auricle.
l, The boundary between the sinus and right ventricle.
m, n, Flethy pillars within the auricle, called *Musculi Pectinati*.
o, o, The Valve of EUSTACHIUS.
p, The valve at the mouth of the coronary vein.
q, The vestige of the foramen ovale.
r, r, A tendinous circle giving origin to the valvula tricuspidis.
s, s, Are placed upon the valvula tricuspidis, and in the opening between the auricle and its corresponding ventricle.
t, t, The beginning of the right ventricle.
u, The pulmonary artery.

FIG. 2.

Represents the CAVITY of the LEFT AURICLE.

- a, b*, The cut edge of the left venous sinus.
c, Part of the sinus cut and turned down.
d, e, The proper auricle laid open on its posterior and left side.
f, g, The termination of the superior and inferior pulmonary veins of the right side.
h, i, The orifices of the superior and inferior pulmonary veins of the left side.
k, k, l, The inner surface of the sinus, which is smooth and uniform.
m, n, The cavity of the proper auricle, with its columnæ carneæ.
o, The beginning of the valvula mitralis, and opening of the auricle into the corresponding ventricle.

- p*, Part of the left ventricle.
q, The vena cava superior.

FIG. 3.

The VENTRICLES laid open at their Fore and Left Side; a Portion of the SEPTUM removed, and the HEART turned Obliquely forwards and to the Right Side, to exhibit the VALVES of the VENTRICLES and ARTERIES, with their Relative Situations.

- a, b, c, d*, The cavity and cut edge of the right ventricle.—*c*, A thick fleshy part of the ventricle.—*d, d*, The partition between the right and left ventricle.
e, e, The fore-part of the circular membrane of the tricuspid valve.
f, f, f, Tendinous cords from the fore-part of the tricuspid valve.
g, g, Tendinous cords from the back part of the tricuspid valve, lying flat upon the sides of the ventricle.
h, h, Flethy columns fixing the valve to the side of the ventricle.
i, i, i, The femilunar valves at the mouth of the pulmonary artery, with their corpuscula.
k, The trunk of the pulmonary artery.
l, l, The left pulmonary veins.
m, Part of the left auricle.
n, o, p, The cut edge of the left ventricle.
q, q, The circular membrane which forms the valvula mitralis.
r, r, Tendinous cords sent off from the valve.
s, s, Columnæ carneæ, fixing the valve to the side of the ventricle.
t, Tendinous cords from the back part of the valve, resting upon the side of the ventricle.
u, u, Flethy columns fixing the tendinous cords of the back part of the valve to the side of the ventricle.
v, v, A few of the many fleshy columns and foveæ represented, with which the side or wall of the ventricle abounds.
x, The femilunar valves at the mouth of the aorta.
y, The aorta.
z, The origin of one of the coronary arteries of the heart, from the beginning of the aorta.

T A B L E LXXXV.

A FRONT VIEW of the HEART and LUNGS, with their Large VESSELS. The ARTERIES and VEINS are Injected, and preserved nearly in their Natural Situation.—The LUNGS from which the Figure was taken were dried, much shrivelled, and contracted.

-
- A, The right subclavian vein.
 B, The right external jugular vein;
 C, Its termination in the subclavian.—Between B and C two pair of valves are seen.
 D, The right internal jugular vein.
 E, A pair of valves at the termination of this vein in the subclavian.
 F, The termination of the principal lymphatic trunk, in the angle between the internal jugular and subclavian veins.
 G, The great right subclavian vein.
 H, The left subclavian vein.
 I, The left external jugular vein, with a pair of valves at its termination in the subclavian.
 K, The internal jugular vein;
 L, Its termination and valves.
 M, The thoracic duct, where it forms a curvature previous to its termination;
 N, Its termination, with a pair of valves.
 O, The great left subclavian, with the termination of the left internal mammary vein.
 P, The vena cava superior, formed by the great subclavian veins, and receiving the right internal mammary vein.
 Q, The vena azygos, turning round the right branch of the trachea, and terminating in the superior vena cava.
 R, The vena cava entering the pericardium;
 S, Its course within the pericardium, before it reaches the heart.
 T, The vena cava inferior.
 U, U, U, The trunks of the hepatic veins joining the vena cava, where it perforates the diaphragm.
 V, The vena cava joining the right auricle.
 W, X, Y, Z, The right auricle; only a small part of which is seen in this view.—W, X, The proper auricle.—Y, Z, The right venous sinus.
 a, b, c, d, The right ventricle, with branches of the coronary artery and vein dispersed upon it.—a, The space opposite to the opening of the auricle into the ventricle.—c, The point of the ventricle.—d, The beginning of the pulmonary artery.
 e, Two of the *Sinuses* of VALSALVA, the third being placed on the opposite side of the artery.
 d, f, The continuation of the trunk of the pulmonary artery, which is here fore-shortened, on account of its oblique course backwards.
 f, The passage of the artery through the pericardium, and its division into two great branches.
 g, g, The two pulmonary branches, the right considerably longer than the left.
 h, h, &c. The principal ramifications of these branches in the lungs.
 i, i, &c. The pulmonary veins.
 k, k, Their passage towards the left venous sinus and auricle.
 l, A small part of the left auricle.
 m, The part where the left auricle opens into,—n, o, p, q, the left ventricle.
 m, o, p, The septum cordis, over which the left coronary artery and vein pass.
 q, The apex of the heart.
 r, The beginning of the aorta, and one of the *Sinuses* of VALSALVA.
 r, s, The aorta ascendens, and its situation within the pericardium.—s, That part of the aorta sometimes called its Great Sinus, on account of its size.
 s, t, The arch of the aorta, sending off,
 u, The arteria innominata,
 v, The left carotid, and;
 w, The left subclavian.
 x, The division of the arteria innominata, into,
 y, The right subclavian, and;
 z, ——— carotid.
 1. The continuation of the left carotid,
 2. That of the left subclavian.
 3. The aorta descendens.
 4. The trachea.
 5. The right branch of the trachea, the left branch being concealed under the arch of the aorta.
 6. 6. &c. Branches of the trachea in the lungs.
 7. 7. &c. The lungs shrivelled.
 8. 8. &c. The root of the pericardium remaining in its natural situation, to shew that that membrane incloses not only the heart, but also a considerable portion of some of its large vessels.

TAB. 85.

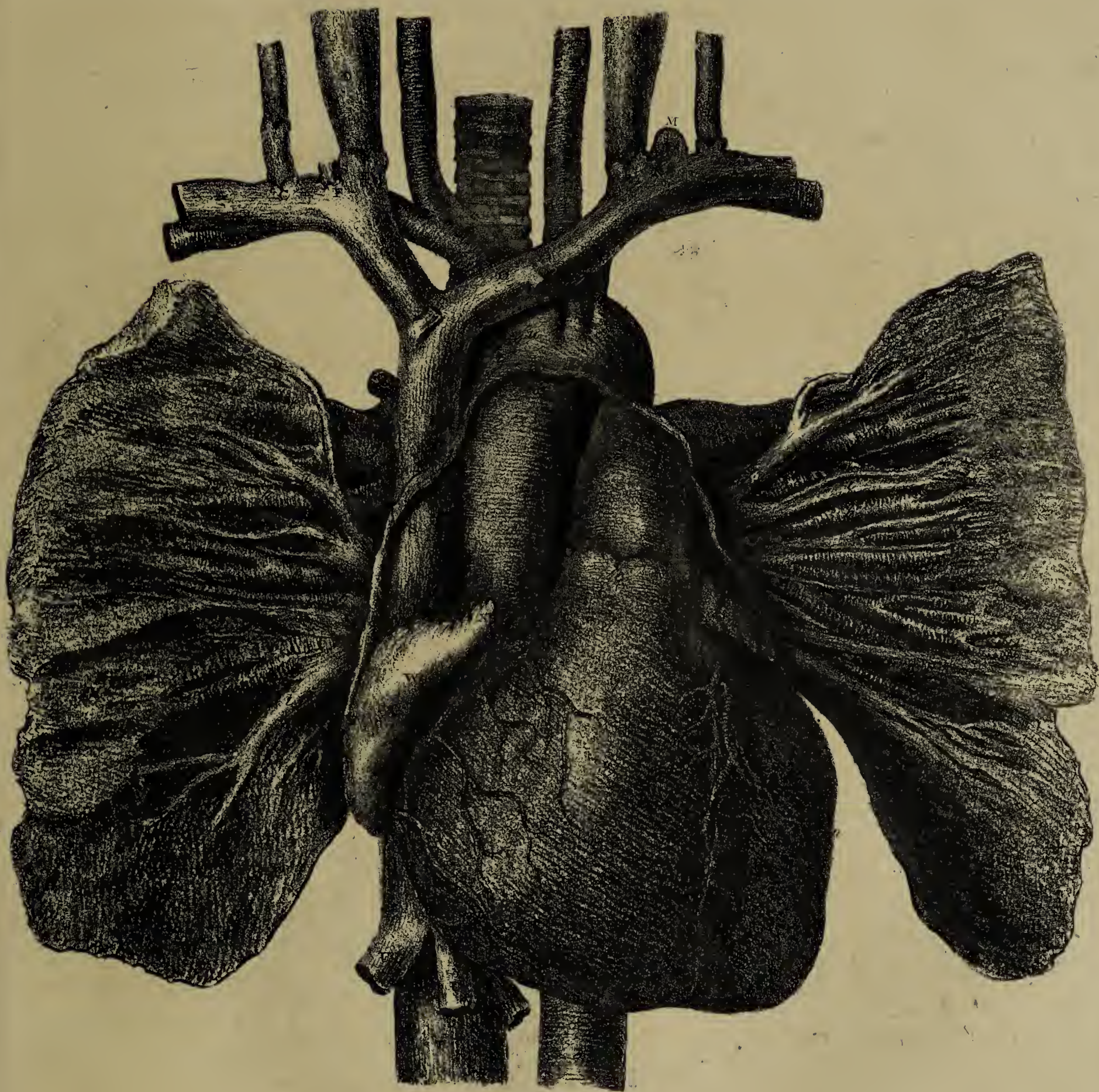


FIG. I

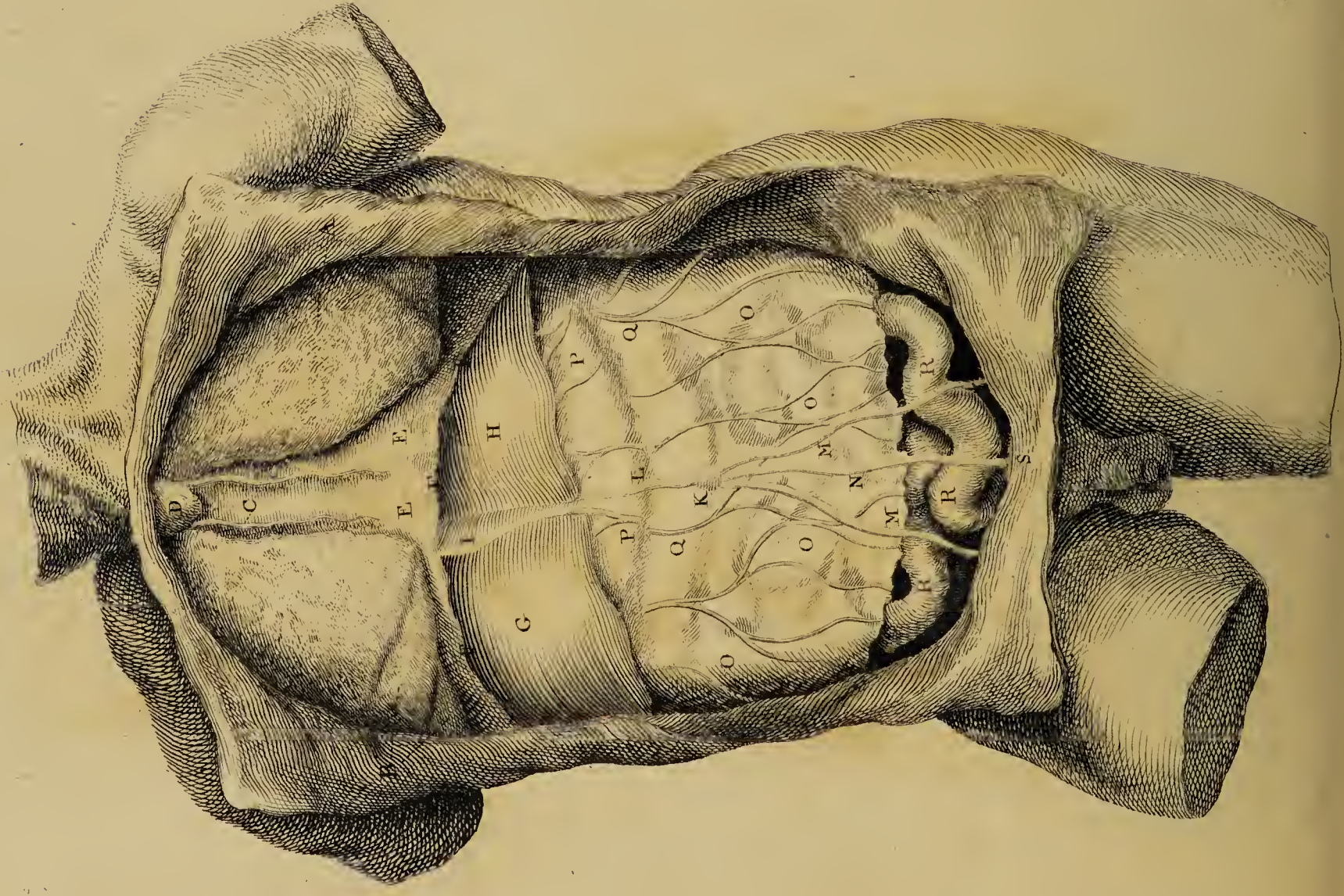


FIG. II

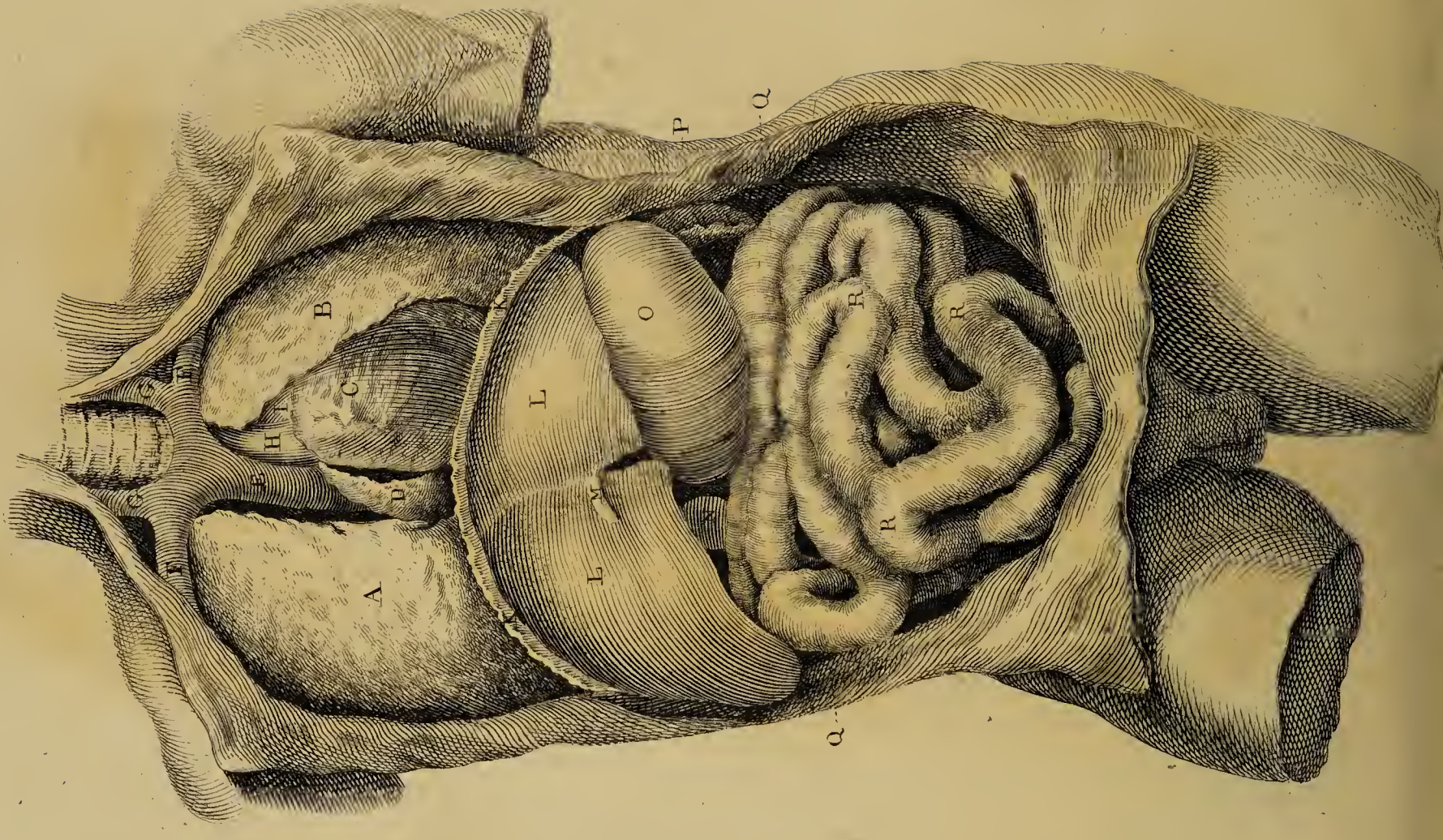
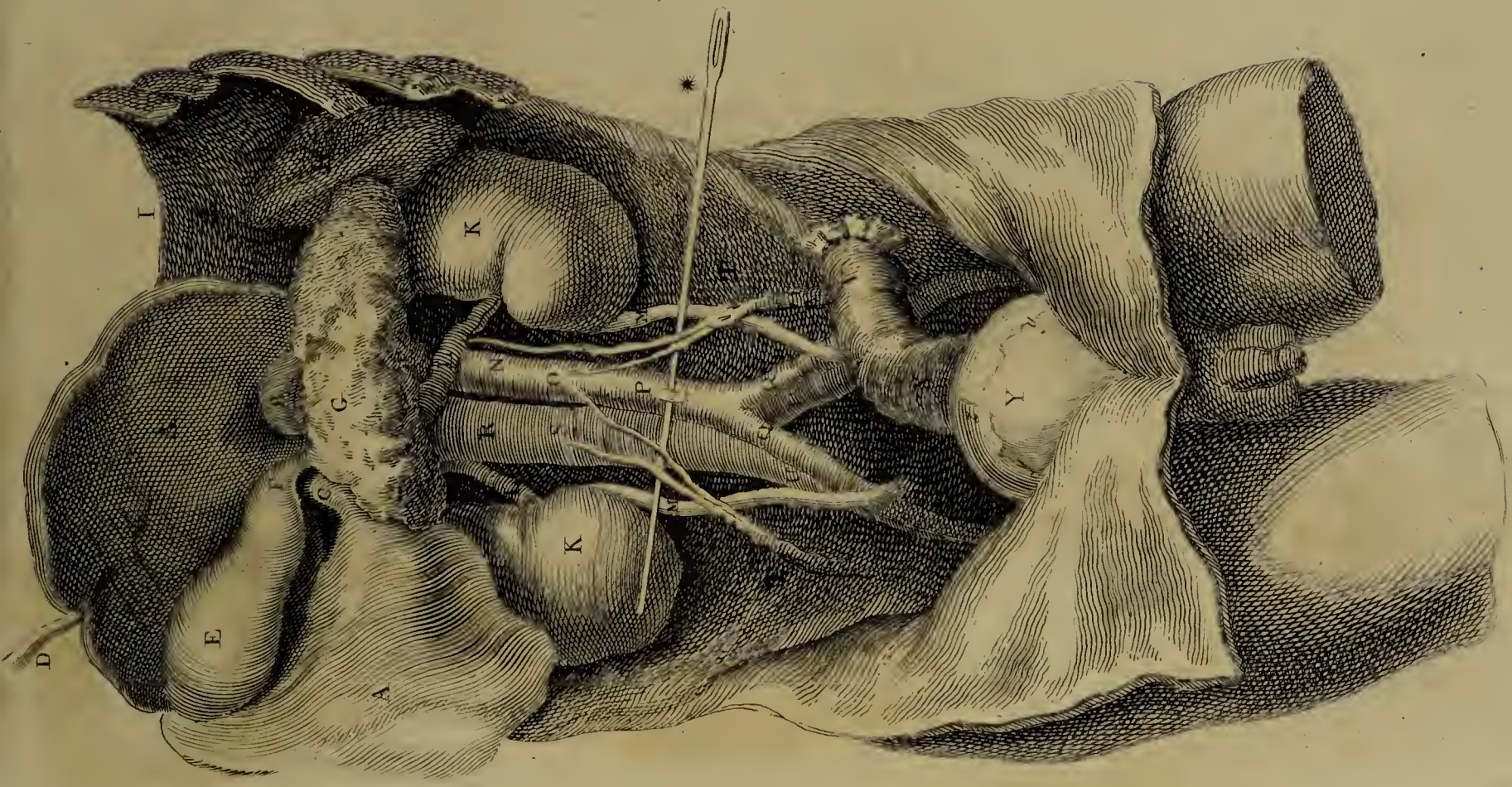
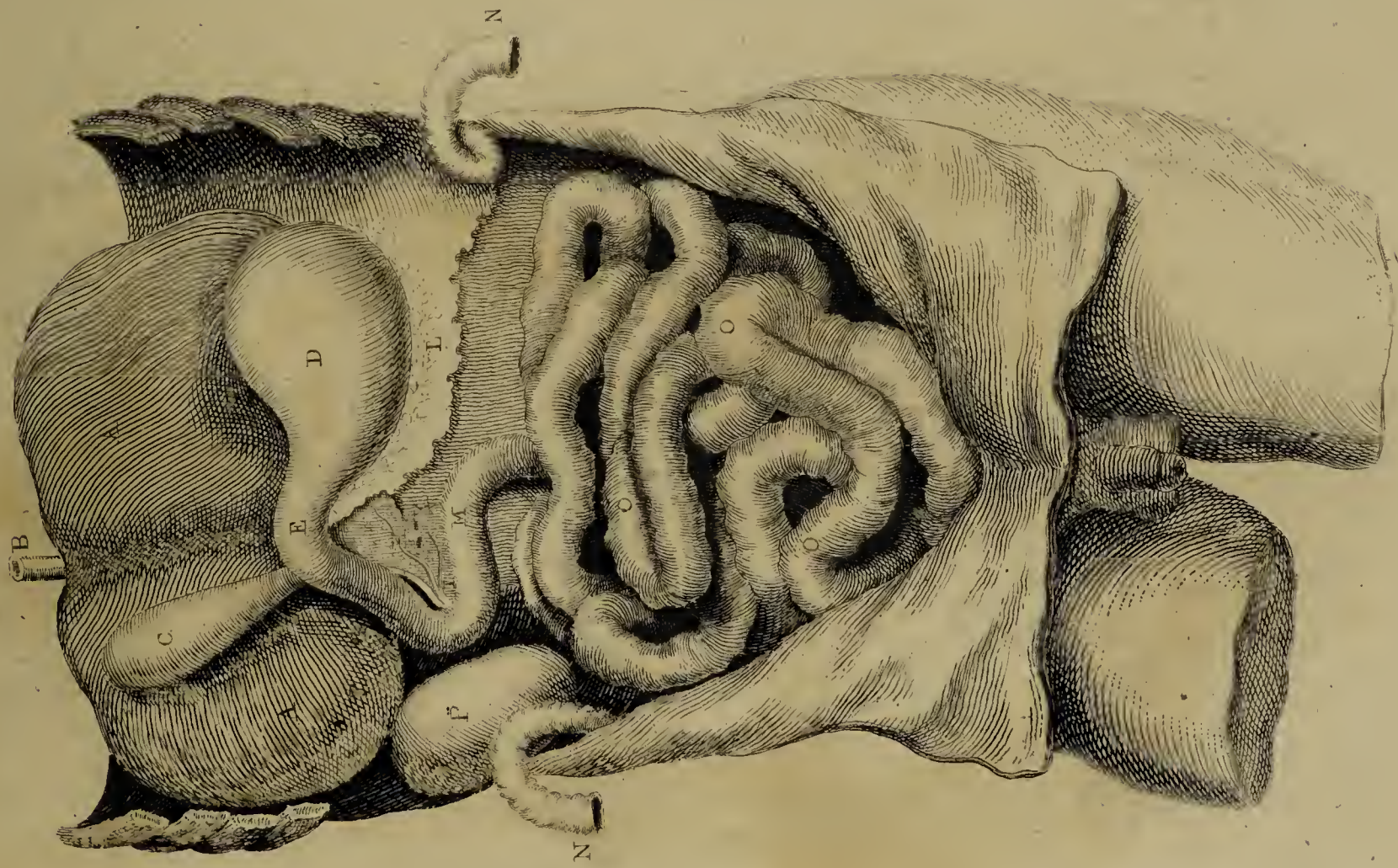


FIG. III



T A B L E LXXXVI.

Represents the Situation of the THORACIC and ABDOMINAL VISCERA.

FIG. 1.

The STERNUM, part of the RIBS and ABDOMINAL MUSCLES removed, and the INTEGUMENTS turned back; to obtain a View of the VISCERA situated in the Fore-part of the THORAX and ABDOMEN.

- A, The two lobes of the left side of the lungs.
 B, The three lobes of the right side of the lungs.
 c, c, The pleura, going to form,
 C, The anterior part of the mediastinum.
 D, The thymus.
 E, E, The pericardium.
 F, F, F, A section of the diaphragm.
 G, H, The right and left lobes of the liver.
 I, The ligamentum latum of the liver.
 K, The umbilicus.
 L, The umbilical vein, changed into the ligamentum rotundum.
 M, M, The umbilical arteries, changed into ligaments.
 N, The urachus, ascending from the fundus of the bladder, to be fixed to the umbilicus.
 O, O, O, O, Q, Q, The omentum majus, with its blood-vessels.
 P, P, The stomach.
 Q, Q, The large arch of the colon, shining through the omentum.
 R, R, R, The under part of the small intestines:—The upper part is seen obscurely through the omentum.
 S, The fundus of the bladder.

FIG. 2.

A View of the CONTENTS of the THORAX and ABDOMEN, after removing the OMENTUM, URACHUS, and UMBILICAL ARTERIES in the latter, and THYMUS, MEDIASTINUM, and PERICARDIUM in the former.

- A, The right lung, part of which is cut off, to shew the large blood-vessels.
 B, The left lung.
 C, The right ventricle of the heart.
 D, The right auricle of the heart.
 E, The vena cava superior.
 F, F, The subclavian veins.
 G, G, The internal jugular veins.

- H, The aorta ascendens.
 I, The pulmonary artery.
 K, K, The diaphragm.
 L, L, The right and left lobes of the liver, with the vestige of the ligamentum latum between them.
 M, The ligamentum rotundum.
 N, The fundus of the gall-bladder.
 O, The stomach, pressed by the liver towards the left side.
 P, The spleen.
 Q, Q, The kidneys, hid by the intestines.
 R, R, The convolutions of the small intestines.

FIG. 3.

Represents the Situation of the DUODENUM. The Figure is taken from the BODY of a Fœtus; but, according to the Author of the Figure, there is no essential Difference between the DUODENUM in this and in the Adult state.

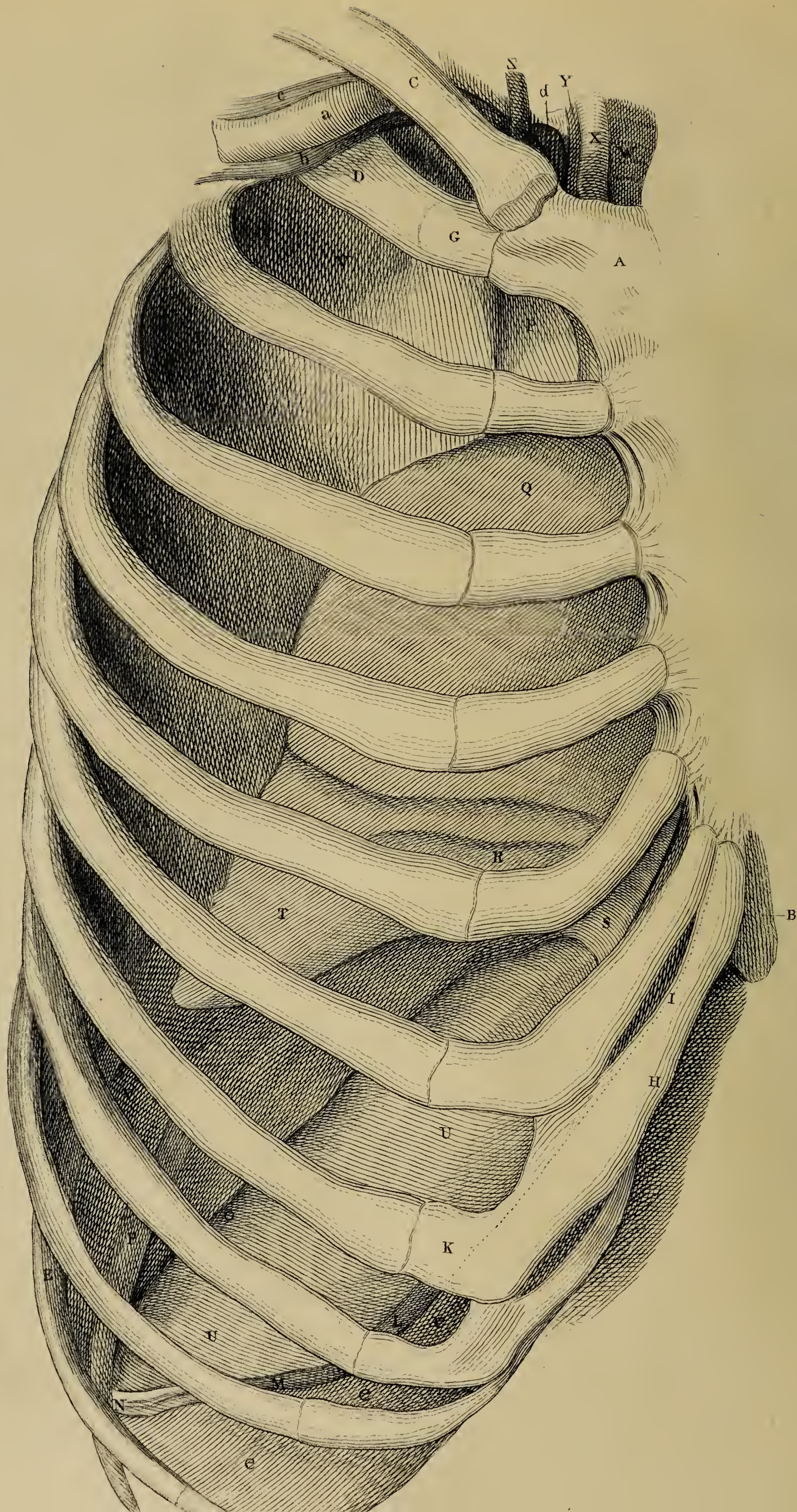
- A, The liver, proportionally larger than in the adult.
 B, The umbilical vein.
 C, The gall-bladder full of bile, and more pyriform than in the adult.
 D, The stomach distended with air.
 E, The seat of the pylorus, and beginning of the duodenum.
 F, The duodenum making a turn to go across the spine.
 G, The termination of the ductus communis choledochus in the duodenum.
 H, The pancreatic duct terminating in the duodenum, at the side of the common biliary duct.
 I, The duct of the pancreas minus, ending in the pancreatic duct.
 K, The mesenteric artery and vein, cut as they pass in the notch between the pancreas and pancreas minus.
 L, The remains of the omentum.
 M, The continuation of the duodenum, drawn considerably down, along with the other intestines, so as to have a full view of its other parts.
 N, N, The cut ends of the great arch of the colon turned aside.
 O, O, The turns of the jejunum and ilium.
 P, The right kidney.

FIG. 4.

The Situation of the VISCERA in the Upper, Back, and Under Part of the ABDOMEN.

- A, The hollow or inferior surface of the liver, turned upwards and to the right side.
 B, The lobulus SPIGELII.—Between B and C, The porta.
 D, The ligamentum rotundum.
 E, The gall-bladder.
 F, The beginning of the cystic duct.
 G, The pancreas.
 H, The spleen.
 I, The ribs.
 K, K, The kidneys.
 L, L, The renal veins.
 M, M, The ureters.
 N, The aorta.

- O, The spermatic arteries.
 P, The beginning of the inferior mesenteric artery.
 * A probe supporting the spermatic vessels, and beginning of the mesenteric artery.
 Q, Q, The common iliac arteries.
 R, The inferior vena cava.
 S, s, The spermatic veins.
 T, T, The spermatic arteries and veins closely embracing each other, in their way to the testes.
 U, U, The common iliac veins.
 V, The end of the colon.
 X, The beginning of the rectum.
 Y, y, y, z, The bladder of urine.
 Y, The part which is covered only by cellular substance.
 y, y, z, Shews how far the peritoneum reaches down upon the fore-part of the bladder.
 z, The urachus.



T A B L E LXXXVII.

Gives an Oblique VIEW of the Right Side of the THORAX ; a Portion of the INTERCOSTAL MUSCLES being cut out, to shew the depth of the PLEURA, and the attachment of the DIAPHRAGM to the RIBS.

-
- A, The upper part of the sternum.
 B, The cartilago ensiformis.
 C, The anterior portion of the clavicle.
 D, The first rib.
 E, The tenth rib.
 F, The eleventh rib.
 G, The cartilage of the first rib.
 H, ————— seventh rib.
 I, K, L, M, N, O, The insertions of the diaphragm to the ribs ; I, K, A dotted line opposite to the insertion of the diaphragm to the cartilage of the seventh rib ; L, M, N, The cut edge of the diaphragm, at its insertion to the eighth, ninth, tenth, and eleventh ribs ; O, The back part of the diaphragm attached to, and concealing the twelfth rib.
 P, The upper part of the superior mediastinum.
 Q, R, S, T, The three lobes of the right lung collapsed ; S, An adhesion of the lung to the diaphragm.
 U, U, The thoracic side of the diaphragm which is pulled a little down, to shew the depth of the pleura at the lateral and posterior part of the thorax.
 V, V, The inner surface of the back part of the thorax, covered with a thickened pleura, which conceals ribs in that part.
 W, The trachea pulled towards the left side.
 X, The common carotid artery, not sufficiently filled with an injection.
 Y, The internal jugular vein collapsed.
 Z, The vertebral artery.
 a, The subclavian artery over-distended.
 b, ————— vein.
 c, One of the brachial nerves.
 d, The cavity of the thorax, extending somewhat higher than the first rib.

OF THE ABDOMEN.

THE *Abdomen* or *Belly* extends from the *Thorax* to the under part of the *Trunk*.

It is bounded above by the *Diaphragm*, and the *Bones* to which that *Muscle* is fixed; below, by the *Pelvis*; behind, by the *Lumbar Vertebrae* and *Muscles* of the *Loins*; anteriorly, by its proper *Muscles*; and laterally, by the *Falſe Ribs*, *Oſſa Ilii*, and *Muscles* connected with theſe;—all of which have been deſcribed in their places.

It is divided into *three Regions*, termed *Upper*, *Middle*, and *Under Region*; each of which is ſubdivided into three others.

The *Upper Region* begins oppoſite to the *Cartilago Enſiformis*, at a ſmall depression called *Scrobiculus Cordis*, and extends to about a hand-breadth from the *Umbilicus*.

The middle of this *Region* is termed *Epigastrium*, or upper part of the *Belly*, and the two lateral parts *Hypochondria*, from their lying under the *Cartilages* of the *Falſe Ribs*.

The *Middle Region* occupies an equal diſtance above and below the *Umbilicus*.—The middle part of it is called the *Umbilical*, and its lateral parts the *Lumbar Regions* or *Loins*.

The *Under Region* begins where the middle one terminates, or at a line drawn between the ſuperior anterior *Spinous Proceſſes* of the *Oſſa Ilii*, and forms, in the middle, the *Hypogastrium* or bottom of the *Belly*; and at the ſides, the *Iliac Regions*.

The *Abdomen* is covered on the outside by the *common Integuments*, and lined within by the *Peritoneum*, in the manner the *Thorax* is lined by the *Pleura*, but without being divided by the intervention of a *Partition*.

The *Abdomen* contains the *Chylopoietic* and *Assistant Chylopoietic Viſcera*, or *Organs of Diſtention*,—the *Organs of Urine*, and part of thoſe of *Generation*, with the *Veſſels* and *Nerves* which belong, ſome of them to theſe *Viſcera*, and others to the lower parts of the *Body*.

The *Chylopoietic Viſcera* comprehend the *Stomach*, which is ſituated in the upper and left part of the *Abdomen*,—the *Intestines*, which fill the greater part of it,—and the *Membranes*, termed *Omenta* and *Mesentery*, which are connected with theſe.

The *Assistant Chylopoietic Viſcera* conſiſt of the *Liver*, which is placed in the upper and right ſide of the *Abdomen*;—of the *Spleen*, which is ſituated in the upper and left ſide of it;—and of the *Pancreas*, which lies under the *Stomach*.

Of the *Organs of Urine*, the *Kidneys* are placed in the back part of the *Abdomen*, and the *Bladder*, with ſome of the *Organs of Generation*, in the *Pelvis*.

PERITONEUM.

The *Peritoneum*, named from its being ſtretched or ſpread around the *Bowels*, is a firm but ſimple *Membrane*, by which the *Abdominal Viſcera* are ſurrounded, and partly ſupported. Tab. LXXXVIII.

Its *External Surface* is rough and *Cellular*, and cloſely connected with the parts to which it belongs.

The *Internal Surface* is remarkably ſmooth, and lubricated by a *Liquor* which is exhaled from its own *Veſſels*.

It is very elastic, and admits of great extenſion, as happens in *Gestation*, *Corpulency*, or *Ascites*; but, upon the cauſes of extenſion being removed, it returns to its former dimensions.

It lines the *Diaphragm*, and paſſes downwards, adhering firmly to the *Abdominal Muſcles*.—It alſo lines the containing, and covers the contained parts of the *Pelvis*, from which it is reflected in the back part of the *Abdomen*, lining the *Muſcles* there, and, by its reduplications, covering the *Bowels* and great *Blood-veſſels* of that *Cavity*. Strictly ſpeaking, however, the *Abdominal Viſcera* may be ſaid to lie on the outside of the *Peritoneum*.

In its paſſage from one *Bowel* to another, it forms *Doublings* which ſerve as *Ligaments* to fix the *Bowels* to each other, and likewise to the *Body*.

It gives a general *Covering* to moſt of the *Bowels*, a partial one to a few, and to thoſe which are deep-ſeated, and project leaſt, a ſtill more partial *Covering*.

It forms a large *Sac*, the poſterior part of which adheres firmly to the different *Viſcera*, and the anterior to the *Abdominal Muſcles*;—the part lining the *Abdomen* being merely in contact with its contents, and allowing a ſmall degree of motion.

The *Cellular Subſtance*, on the *External Surface* of this *Membrane*, is not every where of equal thickneſs, being in ſome parts, as upon the *Bowels*, remarkably thin; in others, as over the *kidneys*, filled with a conſiderable quantity of *Fat*.

The *Cellular Subſtance* forms various *Proceſſes* or *Productions*, ſome of which, as thoſe on the *Spermatic Cords*, paſs through *Foramina*, to be connected with the neighbouring parts; and the *Proceſſes* are ſent off, without affecting the *Internal Membrane*; the one not accompanying the other.

The *Arteries* of the *Peritoneum* come from the *Internal Mammary*, *Epigaſtric*, *Inferior Intercostal*, *Lumbar*,
Sacral,

Sacral, and Ileo-lumbar Arteries, and from those which supply the Abdominal Viscera.

The *Veins* have the same course, bear the same names with the Arteries, and in general pass to the Inferior Cava.

The *Absorbents* are numerous, and run chiefly to the Iliac and Lumbar Plexus.

The *Nerves*, which are few in number and small, are from the Inferior Dorsal, the Lumbar, the great Sympathetic and Sacral Nerves.

Its Blood-vessels, however, are not very numerous, neither does it possess much sensibility when free from disease.

The Peritoneum lines and strengthens the Cavity of the Abdomen; incloses and assists in supporting its different Viscera; furnishes most of them with an External Coat; connects them to the Body; and, by its smoothness and slipperiness, prevents the effects of Friction.

Upon the outside of the Peritoneum are *Four White Lines*, or small Cords, three of which are Vessels in the Fœtus,—one of them a Vein, and two of them Arteries; the fourth is the Urachus.—In the Adult, they are shrivelled up, and serve as Ligaments; the Vein forming the Round Ligament of the Liver, the three other Cords forming Ligaments of the Bladder. Tab. LXXXI. —Tab. LXXXVI.

STOMACH.

The *Stomach* is a large Bag or Reservoir, situated obliquely across the upper and back part of the Abdomen, in the left Hypochondriac and Epigastric Regions. Tab. LXXXI. N.—Tab. LXXXIX.

It is turned downwards and forwards, so as to form an Angle with the Esophagus, the Angle becoming more conspicuous in proportion as the Stomach is more distended.

The right part of the Stomach is situated under the left part of the Liver, the rest of it is placed immediately under the Diaphragm; and in the upright position of the Body, the Stomach rests upon the Intestines. Tab. LXXXVI. Fig. 2. U.

The Stomach is long, round, and tapering, and has been compared in shape to the Bag of a Bagpipe. Tab. XCI.

The size is in proportion to the quantity of Aliment it has been accustomed to receive, and therefore is commonly larger in Men than in Women.

It has a *Large* and *Small Extremity*, an *Upper* and *Under Surface*, a *Great* and *Small Curvature*, a *Left* and *Right Orifice*, and consists of several *Layers* or *Coats*.

The *Large*, called also the *Left Extremity*, is situated in the left Hypochondriac Region; is in contact with the Spleen; is considerably higher than the *Small* or *Right Extremity*, which is placed in the Epigastric Region, and approaches more or less towards the right Hy-

pochondrium, in proportion as the Stomach happens to be more or less distended. Tab. XCII. Fig. 1.

The *Upper Surface* is turned towards the Diaphragm, the *Under* towards the Intestines;—but when the Abdomen is laid open,—unless the Stomach be considerably distended,—the superior Surface becomes anterior, and the inferior Surface posterior.

The *Large Curvature* is turned obliquely forwards and backwards towards the Abdominal Muscles, and extends from one Orifice to the other. Tab. XCII. M, M.

The *Small Curvature* is opposed to the other, and turned backwards and upwards, towards the Spine, extending also between the two Orifices. Tab. XCII. N, N.

The *Orifices* are next the Small Curvature. The Left is termed *Cardia*, or *Os Ventriculi*, or *Upper Orifice* of the Stomach.—It is opposed to the Spine, at a little distance from it, and is formed by the termination of the Esophagus.—It allows a free passage for the Food into the Stomach, the return of which is prevented by the Angle formed between the Stomach and Esophagus, by the fleshy parts of the Cardia, and by the fleshy Crura of the Diaphragm, between which the Cardia is situated. Tab. XCI. k.

The *Right* or *Inferior Orifice*, commonly termed *Pylorus*, is situated under the small Lobe of the Liver, a little to the Right Side of the Spine,—is turned more forwards than the Cardia, and is considerably lower, but rises in proportion to the Distension of the Stomach. Tab. XCI. l.—Tab. XCII. Fig. 1. O.—Tab. XCI. l.

The Stomach is connected by the Cardia to the Esophagus,—by the Pylorus to the beginning of the Intestines,—by the Peritoneum and Blood-vessels to the Spleen,—and by a reflection of the Peritoneum to the root of the Liver, and to the great Intestines.

The *Structure* of the Stomach is in general similar to that of the Esophagus, of which it is a kind of Expansion.

The *Coats* of the Stomach are *Four* in number.

The First or *External Coat*, called also *Peritoneal*, is a Reflection of that part of the Peritoneum which comes from the root of the Liver. Tab. XCII. Fig. 2.

It strengthens the Stomach; by its smoothness it diminishes the effects of Friction; and possessing few Nerves or Blood-vessels, it is not very susceptible of pain or inflammation.

The Cellular Substance under the Peritoneal Covering, is described by some Authors as a distinct Coat, called *Tunica Cellulosa Ruyschiana*;—but ought not to be numbered among the Coats of the Stomach.

The Second or *Muscular Coat* is composed chiefly of two Planes of Fibres variously disposed.

The External Plane is longitudinal, extends from the longitudinal Fibres of the Esophagus, and follows the same general course with that of the Stomach from the Great to the Small Extremity. Tab. XCII. Fig. 4.

Upon each side of the small Curvature, the longitudinal Fibres form a thick, strong, Muscular Band.

The

The second Plane is chiefly transverse or circular, and considerably thicker and stronger than the other. Tab. XCII. Fig. 5.

Its Fibres are intersected by many small, white, Tendinous-like Lines;—these, however, are in a great measure formed of that Cellular Substance by which the two Coats are united.

The Muscular Coat assists in the Digestion of the Food, by giving a gentle motion to the Stomach, according to the direction of its Fibres; the one set shortening it, the other rendering it narrower.

The Pylorus is formed by a Doubling of the two inner Coats, which project into the Passage between the Stomach and Intestines, and contain a *Ring* of Muscular Fibres, which form a Sphincter, called *Sphincter Pylori*. Tab. XCII. Fig. 9.

This Substance, by contracting, prevents the grosser indigested parts of the Aliment from escaping, and, by dilating, allows the Pulpy digested part to pass to the Intestines.

The Third Coat, commonly called *Nervous*, but properly *Cellular*, consists of a large quantity of fine Cellular Substance without Fat, and is intermixed with, and supported by small Aponeurotic-like Filaments, which cross each other obliquely, but which are also of a Cellular nature. Tab. XCII. Fig. 8.

This Coat strengthens the Stomach, and allows the Vessels to be distributed to the Inner Coat, with which it is intimately connected.

The Fourth or *Inner Coat*, called also *Villous*, is continued from the Inner Coat of the Esophagus, but has much more of a Velvet appearance than it.—It is formed of fine, short, prominent Villi, which are crowded with Small Vessels, some for furnishing a Mucous Liquor to the Stomach, others for absorbing a portion of the thinner part of the Food. Tab. XCII. Fig. 7.

The two last Coats are more extensive than the rest; and form, upon the inner part of the Stomach, many Doublings, termed *Rugæ*, the greater number of which run in a waving transverse direction, and are afterwards divided into a sort of *Net-work*. Near the Orifices, however, especially towards the upper one, they run more in a longitudinal direction, and have a radiated appearance at the Cardia. Tab. XCII. Fig. 6.

The *Rugæ* of the Stomach, like the *Plicæ* of the Esophagus, are most distinct when the Stomach is empty;—when it is full, they are much less evident.

They admit of distension without endangering the Vessels and Nerves dispersed in them, and assist a little in detaining the Aliment till properly digested.

From the inner Surface of the Stomach, a *Liquor* issues, which is found to approach to the nature of Saliva, and is termed *Gastric Juice*.—This was formerly supposed to come from Glands seated in the Third Coat, but is now more frequently considered as a Secretion from the Arteries of the Stomach, no Glands being evident there, at least in the sound state of this Viscus.

The Arteries of the Stomach are derived from the Celiac Artery. They consist of the Superior Gastric, which supplies the place next the small Curvature; of the Right Inferior Gastric, which is a branch of the Hepatic; of the Pyloric Arteries, which are small branches from the Gastrics and from the Hepatic; and of the Left Gastric and Arteriæ Breves, which are branches of the Splenic Artery.

The *Veins* have the same names, and nearly the same course with the Arteries. The whole of them terminate in the Vena Portæ.

The *Absorbents* of the Stomach are numerous and large. They pass through small Glands situated upon its Curvatures, and go afterwards to the Thoracic Duct.

They appear to carry Lymph only, no Chyle having been detected in them, even in cases where the Lacteals were found full of it.

The *Nerves* are chiefly from the Eighth Pair, and partly from the Great Sympathetics, and are most numerous upon the Cardia.

The Stomach receives the Food from the Esophagus, and afterwards prepares it, by Digestion, for the Intestines.

The digestion of the Food in the Stomach is found to be effected,—by Triture, which is performed by the motions of the Stomach and surrounding Muscles,—by Dilution,—by a partial Fermentation,—but chiefly by the action of the Gastric Juice serving as a Menstruum.

INTESTINES.

The *Intestines* consist of a long Cylindrical Canal, which begins at the Inferior Orifice of the Stomach, and, after winding in various directions, terminates in the Anus. Tab. LXXXVI.—Tab. XCII. Fig. 1.—Tab. LXXXIX.

In general they are about six times the length of the Body to which they belong; though, in a Person of short stature, the proportional length of the Intestines is greater, and *vice versa*.

They occupy a large part of the Abdomen, and are connected to the Body through their whole extent, by a Doubling of the Peritoneum.

On account of the inequalities of their size, they are divided into *Small* and *Large* Intestines, and each of these again have their subdivisions.

SMALL INTESTINES.

The *Small Intestines* are smooth on their outer Surface, and of a tapering form, becoming gradually less in their diameter from their upper to their under extremity, and are divided into the *Duodenum*, *Jejunum*, and *Ilium*.

The *Duodenum* begins at the Pylorus, and makes a short turn upwards and backwards, by the Neck of the Gall-bladder,

Gall-bladder, to which it is contiguous; having the Anterior Layer of the Omentum fixed to its inferior part, and the Omentum Minus to its opposite side. Tab. LXXXVI. Fig. 3. E—M.

It then passes obliquely downwards and to the right side, before the Great Vessels which go into the Liver, and likewise before the Renal Artery and Vein; the Gut being included in the Cellular Substance of the Meso-colon. Tab. LXXXVI. Fig. 3.

Opposite to the under part of the Kidney, it makes a turn to the left side, where it is lodged in the common root of the Meso-colon and Mesentery, receiving into its back part the ends of the Biliary and Pancreatic Ducts, and going over the Aorta and Vena Cava, at the upper part of the Lumbar Vertebrae. Tab. LXXXVI. Fig. 3.

In passing across these Vessels, it is involved in the root of the Mesentery, and ascends a little till it gets to the left side of the Spine; then, perforating the common root of the Mesentery and Meso-colon, it makes a turn forwards, and obtains the name of *Jejunum*. Tab. LXXXVI. Fig. 3.

The *Jejunum*, so named from its being commonly more empty than the other Intestines, in consequence of the thinner parts of its Contents being sooner absorbed, begins at the last turn of the Duodenum, and forms numerous Convolutions, which run in all directions, and are situated in the upper part of the Umbilical Region. Tab. LXXXVI. Fig. 2.

The *Ilium*, named from its numerous Turns, begins where the *Jejunum* terminates, or where the Internal Plicae become less conspicuous, and is distinguished externally from that Gut, by being smaller, thinner in its Coats, and paler, and from its forming about three-fifths of the length of the two Intestines.

The *Ilium*, like the *Jejunum*, forms many Convolutions, which are situated on the under part of the Umbilical Region, and extend as far as the Hypogastric and Iliac Regions, and not unfrequently, especially in Women, into the Cavity of the Pelvis. Tab. LXXXVI. Fig. 2.—Tab. LXXXIX.

It surrounds the lateral parts of the *Jejunum*, and is supported by the *Ossa Ilii*; and, the last turn of the gut passing across towards the upper edge of the Right *Ossa Ilium*, it terminates by a Valve in the left side of the beginning of the Colon.

Through the whole of this course, the *Jejunum* and *Ilium* are fixed to the Spine by a continuation of the Mesentery.

GREAT INTESTINES.

The *Great*, like the Small Intestines, form one continued Canal, which tapers from its upper to near its under Extremity; but they differ from them in being considerably wider, shorter, and straighter, in being irregular in their Outer Surface, and tacked up into Cells, and

in having many Processes depending upon them, termed *Appendiculæ Pinguedinosæ*.

Like the Small Intestines, also, they are divided into three parts, termed *Cæcum*, *Colon*, and *Rectum*.

The *Intestinum Cæcum* forms a round short Bag, only about three or four Fingers-breadth in length, and nearly the same in diameter. The *Cæcum*, properly so called, is that part of the Intestine which lies under the insertion of the *Ilium*, though frequently the dilated beginning of the Colon is distinguished by the same name.

It is situated in the Right Iliac Region, resting on the Cavity of the corresponding *Ossa Ilium*, at the under end of the Right Kidney, and is concealed by the last Convolutions of the *Ilium*. Tab. XCII. Fig. 1. T.

The bottom of it is turned downwards, and forms a shut Sac; the mouth of which is directed towards the Colon, and may be considered as forming the *Cæcum Caput Colli*. Tab. XCII. Fig. 18. B.

At the posterior and left side of the *Cæcum*, there is a *Small Process* about the same length with the *Cæcum* itself, but the diameter not larger than that of a Goose-quill,—termed *Appendix Vermiformis*, from its resemblance to an Earth-worm, and *Appendix Cæci*, from its connection with the *Cæcum*. Tab. XCII. Fig. 18. C.

It is convoluted, and fixed by its sides to the *Cæcum*.

It has two extremities, one of which is impervious, the other opens obliquely into the back part of the *Cæcum*.

The *Colon* is by much the longest of the large Intestines. It encircles the small Guts, and is contiguous to most of the Abdominal Viscera. Tab. XCII. Fig. 1. U, U, &c.

It is a continuation of the *Cæcum*; beginning at the termination of the *Ilium*.

It ascends in the Right Lumbar Region, over the Kidney of that side, to which it is connected.

From the Kidney, it passes forwards, and crosses the Abdomen in the Epigastric and Hypochondriac Regions, connected to the Duodenum, under the name of *Great Arch of the Colon*.

The right portion of the Great Arch is situated under the Liver and Gall-bladder, the latter of which, after Death, commonly tinges part of it and the Duodenum with Bile.

The left portion of the Arch is situated under the Stomach; and immediately below the Arch are the Convolutions of the *Jejunum*.

In the Left Hypochondrium, it turns backwards under the Spleen, and descends in the left Lumbar Region, on the fore-side of the Kidney, to which also it is closely connected. Tab. LXXXIX.

In the Left Iliac Region, it forms two Convolutions, compared in shape to the Greek letter ς , and hence called *Sigmoid Flexure* of the Colon, which afterwards constitutes the *Rectum*. Tab. XCII. Fig. 1. W, X.—Tab. LXXXIX.

The

The *Sigmoid Flexure* varies considerably in length in different persons, extending frequently into the Hypogastric Region, and in some instances as far as the Intestinum Cæcum.

The Colon, through its whole extent, is fixed to the Body by means of the Meso-colon.

The *Rectum* begins at the last Lumbar Vertebra, descends upon the fore side of the Os Sacrum and Os Coccygis, and terminates in the Anus, a little beyond the extremity of the Os Coccygis. Tab. XCII. Fig. 1. Y, Y. Tab. LXXXIX.

In its course, it follows the direction of the Bones over which it passes; turning first downwards, then a little backwards, then forwards, and is fixed to them by the Meso-rectum.

The Rectum differs from the other Intestines, in becoming wider in its progress downwards, and forming below a Reservoir for the Fæces.

At the Anus, it contracts into a narrow Orifice, the sides of which are disposed in close longitudinal Folds.

Upon the Outer Surface of the Great Intestines, but more especially upon the Colon, are the *Appendiculæ Pinguedinosæ*, situated at different distances from each other,—thin at their roots, becoming thicker in their bodies, and projecting from the Intestines like so many pendulous Papillæ.

They are covered by the Peritoneum, and are of the same structure and use with the Omentum.

Besides the Appendiculæ, there are on both sides of the adhesions of the Meso-colon, *Adipose Strata*, which are of the same nature with the others.

The colon is divided, longitudinally, into three parts, by as many *Ligamentous-like Bands*, which run upon its Surface.

One of them goes along each side of the Colon; and that most exposed to view, when the Omentum is turned up, is the largest: The third, which is the smallest, and which was discovered by MORGAGNI, is concealed by the attachment of the Meso-colon. Tab. XCII. Fig. 1. U, U. Tab. LXXXIX.

They begin at the root of the Appendix Vermiformis, and, after running along the Cæcum and Colon, they gradually unite, form two, and then terminate on the Rectum. Tab. XCII. Fig. 1. Y, Y.

MESENTERY.

The *Mesentery* is formed by a Doubling of the Peritoneum, which is detached forwards, and includes the Intestines as in a Sling.

It is named from its situation in the middle of the Intestines, and is divided into two parts, one connecting the Small Intestines, and retaining the name of *Mesentery*; the other, the Great Intestines, and termed *Meso-colon*.

The Mesentery begins at the last turn of the Duodenum, and runs obliquely downwards and towards the

right side, along the Vertebrae of the Loins, to the first, second, and third of which it is chiefly connected.

Between the two Layers of the Mesentery, are inclosed a considerable quantity of Cellular Substance and Fat, with the numerous Blood-vessels, Nerves, Lacteals, and Glands of the Jejunum and Ilium. Tab. XCII. Fig. 19. D—G.

Its anterior edge is much more extensive than the posterior, being plaited and folded,—the Plaits corresponding with the Convolutions of the Intestines to which it is fixed.

The *Meso-colon* is the continuation of the Mesentery, which, after reaching the lower extremity of the Ilium, contracts and obtains this name.

It follows the course of the Great Intestines, and fixes them in their place.

Under the Right Kidney, it is narrow and firm, and forms the Right Ligament of the Colon.

Opposite to that Kidney, it appears to be lost by the immediate adhesion of the Colon to the Kidney and Duodenum.

It then turns across, and forms a broad Expansion, which incloses the Arch of the Colon at its anterior edge; and behind, it separates and incloses the anterior part of the Duodenum, and is fixed to the Spine.

It adheres a little to the under part of the left extremity of the Stomach, and then descends over the Left Kidney, at the under end of which it forms the Left Ligament of the Colon.

It afterwards expands, adheres to the Psoas Magnus, and forms a loose Fold, which retains the Sigmoid Flexure of the Colon.

At the last Vertebra of the Loins, it forms the *Meso-rectum*, which by degrees becomes narrower, and disappears towards the under part of the Pelvis; the Rectum being then immediately connected to the Os Sacrum.

Between the Layers of the Meso-colon are placed the Arteries, Veins, and Nerves, with the Absorbents and Glands of the Colon.

The Mesentery, in general, suspends, connects, and retains the Intestines in their places, furnishes them with an external Coat, receives their Glands, Vessels, and Nerves, and allows the two last to be properly distributed.

OMENTUM.

The *Omentum* or *Casul*, formerly called *Epiploon*, from its seeming to float upon the Intestines, is a fine Membranous Bag, intermixed with much Fat, and covering a large portion of the Anterior Surface of the Abdominal Viscera. Tab. LXXXVI. Fig. 1. Tab. LXXXIX.

It is divided into *Omentum Gastro-colicum*, and *Omentum Colicum*; the former common to the Stomach and Colon, the latter proper to the Colon: They are, however, a continuation of one and the same Substance.

The *Omentum Gastro-colicum* consists of an Anterior and

and Posterior part, each of which is formed of two Membranes intimately united.

In young Subjects, the Omentum forms a distinct Bag; but in old People, the Layers of which it is composed become more or less incorporated, and Cribiform or Reticular.

The Anterior Layer is a continuation of the Peritoneal Coats, produced from the upper and under Surfaces of the Stomach.

This Production arises from the whole length of the large Arch of the Stomach, and beginning of the Duodenum; its origin extending as far as the Spleen. It descends a little below the Umbilicus, especially in fat people,—but without adhering to the Abdominal Muscles, behind which it is situated.

Its under edge is reflected, to form the posterior Layer, which ascends without adhering to the Small Intestines over which it is spread, till it reaches the Arch of the Colon, to the greater part of which Arch, and to the Vessels of the Spleen, it is connected.

The *Omentum Colicum* arises from the right part of the Arch of the Colon, just as the other part of the Omentum arises from the Stomach, and sends downwards and to the right side a Cuneiform Process, to be connected to the Cæcum.

Besides the Omentum, there is a Membrane much smaller, situated between the Liver and Stomach, termed *Omentum Hepato-gastricum*, or *Omentum Minus* of WINSLOW, or *Membrana Macilentior* of HALLER, from its having little Fat in it. Tab. XCI. c, c. Tab. XC. Fig. 1. e, e.

It passes from the fore part of the Sinus of the Porta, to the under and back part of the Liver, to be connected to the whole edge of the small Curvature of the Stomach, and to the beginning of the Duodenum.

Like the other Omentum, it is composed of two Layers, but is thinner, less fat, and more uniform in its structure, and also differs from it in having no reflection upwards.

After the Omentum Minus reaches the Stomach, its two Layers separate from each other, inclose that Viscus, and form its External Coat.

At the Great Curvature of the Stomach, they rejoin, and form the Anterior, and then the reflected or Posterior part of the Omentum Majus.

The Posterior part separates again into two Layers, which inclose the Colon, and form its External Coat.

At the opposite side of the Colon, the Layers re-unite, and form the Meso-colon.

By the Membrane thus continued, a large irregular Bag is formed, of which the Omentum Minus, Stomach, and anterior portion of the Omentum Majus, constitute the anterior, and the reflection of the Large Omentum, the Colon, and Meso-colon, the posterior part.

At the upper and right side of the Sac, there is a Passage large enough to admit a Finger, termed *Foramen WINSLOWI*. Tab. XC. Fig. 1. n.

It is situated immediately behind the Cord of the great

Vessels which lead to the Liver, and is of a Semicircular form.

It is composed of the Peritoneum, under the appearance of two Ligaments which connect the surrounding parts to each other.

The Foramen of WINSLOW maintains a communication between the Large Sac of the Omentum and common Cavity of the Abdomen; from which circumstance, Fluids generated by disease may readily pass from one of these Cavities to the other.

The Omentum, by its Fatty nature, serves to lubricate the Viscera, and to prevent them from being injured by Friction.

STRUCTURE OF THE SMALL INTESTINES IN GENERAL.

The *Structure* of the Small Intestines is nearly similar to that of the Stomach, and the number of their *Coats* the same.

The *External Coat*, excepting in a portion of the Duodenum, is a continuation of that part of the Peritoneum which forms the Mesentery. It closely surrounds the Intestines, adhering to them by fine Cellular Substance. Tab. XCII. Fig. 11. A.

The *Second* or *Muscular Coat*, as in the Stomach, is composed of two Planes of Fibres; the External or Longitudinal of which are more minute than the Internal. Tab. XCII. Fig. 11. B.

The *Circular Fibres* are distinct and numerous: They consist of Segments of Circles, which unite at different distances, so as to surround the Canal. Tab. XCII. Fig. 11. C.

The *Longitudinal Fibres* shorten, and the *Circular* contract the Intestines; and upon the alternate relaxation and contraction of these Fibres depends that Vermicular motion called *Peristaltic*, by which the contents are pushed through the Canal.

The *Third*, commonly called *Nervous Coat*, like that in the Stomach, is white and firm, and composed of Cellular Substance without Fat;—its firmness giving strength to the Intestines. Tab. XCII. Fig. 11. D.

The *Fourth*, or *Villous Coat*, differs from that of the Stomach, in forming, with the Cellular Coat, numerous transverse Folds, termed *Valvulae Conniventes*, from their serving as a kind of Valves, to retard the motion of the Food. Tab. XCII. Fig. 21. 13. 14.

One edge of these Valves is fixed to the Intestine, the other is loose. They are much deeper than the Rugæ of the Stomach, and placed opposite to the Interstices of each other, and are of different lengths, not forming entire circles.

The *Villi* of the inner Coat are much more conspicuous than in the Stomach, being composed not only of the extremities of Arteries, Veins, and Nerves, but particularly of the Mouths of Lacteal Vessels; the Origins of which are extremely small, and have a fungous appearance.

Numerous

Numerous *Ducts of Simple and Compound Glands* terminate on this Coat, for the secretion of Mucus.

The former are called *Solitary*, and the latter *Congregate*; and, from their Describers, *Glandulæ PEYERI*, and *Glandulæ BRUNNERI*. Tab. XC. Fig. 15.

They are in the form of *Papillæ*, but so minute as seldom to be seen, excepting in the diseased state;—though they are supposed to be dispersed over the whole of the Canal.

STRUCTURE OF THE SMALL INTESTINES IN PARTICULAR.

The *Duodenum* is the most lax, and the straightest of the Small Intestines, and so large as to have been considered as a *Ventriculus Succenturiatus*, or *Secondary Stomach*.

It is of a redder colour than the rest, has a thicker Muscular Coat, receives only a partial Covering from the Peritoneum, and is fixed more closely to the Body, without floating like the other Intestines.

It is perforated at the distance of three or four fingers-breadth from the Pylorus, by the ends of the Biliary and Pancreatic Ducts, for the reception of Bile and Pancreatic Juice.

On the Duodenum, the Lacteal Vessels begin to make their appearance, and numerous Mucous Glands are found in it, especially near the Pylorus.

The Duodenum receives the Food from the Stomach, and detains it till it be mixed with the Bile and Pancreatic Juice.

The *Jejunum* differs from the Duodenum in deriving its common Coat wholly from the Peritoneum,—in being smaller,—in having a weaker Muscular Coat, the external Fibres of which are extremely minute,—in the *Valvulæ Conniventes*, Villi, and Lacteals which proceed from them, being much more conspicuous and numerous.

The *Ilium* differs from the former in being less in diameter, and its Coats thinner and of a pale colour, and in having fewer and smaller Lacteal Vessels.—In this Intestine the *Valvulæ Conniventes* gradually decrease in size and number, and at length entirely disappear.—At its under end, the Mucous Glands are distinct and frequent.

The Small Intestines in general promote the formation of the Chyle,—allow it to be absorbed, and—propel the remains of the Food into the Large Intestines.

STRUCTURE OF THE GREAT INTESTINES IN GENERAL.

The Great have the same number of Coats with the Small Intestines, but differ from them in being thicker and stronger.—The *Valvulæ Conniventes* are deep, and placed opposite to each other, and, like the Small Intestines, diminish in number and size towards the under extremity.—The Villous appearance is much less distinct.

—The Mucous Glands are larger, but simpler than those of the Small Intestines.

STRUCTURE OF THE GREAT INTESTINES IN PARTICULAR.

The *Intestinum Cæcum* is of the same general structure with the rest of the Great Intestines: Its Villi are very short; and it has a number of solitary Mucous Glands, broader than those of the Small Intestines, which, when diseased, sometimes appear like Small-Pox, with a Perforation in each.

The *Appendix Vermiformis* is of the same structure with the other Intestines, contains no Fæces, but is furnished with numerous Glands similar to those of the Duodenum, the contents of which pass into the Cæcum, a little below the Valve of the Colon, and assist in lubricating that Intestine, and in facilitating the expulsion of the Fæculent Matter. Tab. XCII. Fig. 16. C. Fig. 17. I.

In the Cæcum and beginning of the Colon, the Food coming from the Ilium is retained for some time, and, in consequence of Absorption, acquires a greater degree of consistency, and receives a fætid smell.

The *Valvula Coli*,—sometimes called *Valvula Ilei*, or *Valvula BAUHINI*, from its supposed Discoverer, and *Valvula TULPII*, from the Author who gives a particular description of it,—is situated at the beginning of the Colon, and is placed transversely in the posterior and left part of that Intestine. Tab. XCII. Fig. 18. E.

It is formed of a Projection of the Villous and Nervous Coats, and Circular Muscular Fibres of the Ilium, Cæcum, and Colon, and has two Folds or Lips, with an Aperture in form of a Mouth or Chink between them. Tab. XCII. Fig. 17. G, G.

At the ends of the Valves are two Cords, termed *Retinacula*, or *Frena MORGAGNII*, which retain the Valve in its proper situation. Tab. XCII. Fig. 18. H, H.

The Valve of the Colon allows a free passage for the Contents of the Small into the Large Intestines, but completely prevents their return.

The *Colon* is of a similar structure with the Cæcum.—The Longitudinal Muscular Fibres are collected upon it into three Fasciculi or Bands, which arise at the root of the Vermiform Process, and are continued along the Colon to the Rectum. Tab. XCII. Fig. 16. E, E, E.

The Longitudinal Bands are shorter than the inner parts of the Colon, and of course assist in contracting it, and forming it into Plicæ, which lie across the Gut, answering to the *Valvulæ Conniventes*; only they are at a greater distance from each other, and much larger; dividing the Colon into little apartments, called *Cells*. Tab. XCII. Fig. 18. I, I, I.

The *Cells of the Colon*, with their Partitions, have a three-fold order, the Intestine being almost quite smooth or plain, opposite to the Longitudinal Bands.

The Cells assist in preventing the too rapid descent of the Fæces.

The Colon receives the Excrementitious parts of the Aliment, retains them, changes them into Fæces, and then, by the Peristaltic motion of the Intestines and power of Respiration, pushes them, by slow degrees, to the Rectum.

The *Rectum* differs from the Colon in being covered only anteriorly and laterally by the Peritoneum:—Its Muscular Fibres are stronger and thicker, and spread uniformly over the Intestine. The Circular Fibres are so thick at the end of the Rectum, as to have been named *Internal Sphincter*. Tab. XCII. Fig. 1. Y, Y.

It has no Cells like the Colon; but the Cellular and Inner Coat are so much larger here than they are higher up, as to fall into transverse Folds, which, however, disappear in proportion to the distension of the Intestine.

The middle and under end of the Rectum has numerous large Mucous Glands or Follicles.

The extremity of the Rectum forms a firm Circle, which acts as a Valve, and assists the proper Sphincter in preventing the involuntary discharge of the Fæces.

The Verge of the Anus is surrounded with deep Follicles, the contents of which prevent the tender Skin of the Anus from being excoriated by hard or acrid Fæces.

The Anus is also surrounded with a great deal of Fat, which admits of the dilatation of the Rectum, and facilitates the discharge of the Fæces.

The Rectum receives the Fæces from the Colon, retains them for a certain time, till, by their weight and

acid nature, it is stimulated to discharge them; which it does by the power of its Muscular Coat, and of the Levator Ani, assisted by the action of the Diaphragmatic and Abdominal Muscles.

The *Blood-vessels* of the Intestines are large and numerous, and are derived from different sources.

The Duodenum receives Branches from the Splenic and Hepatic Arteries.

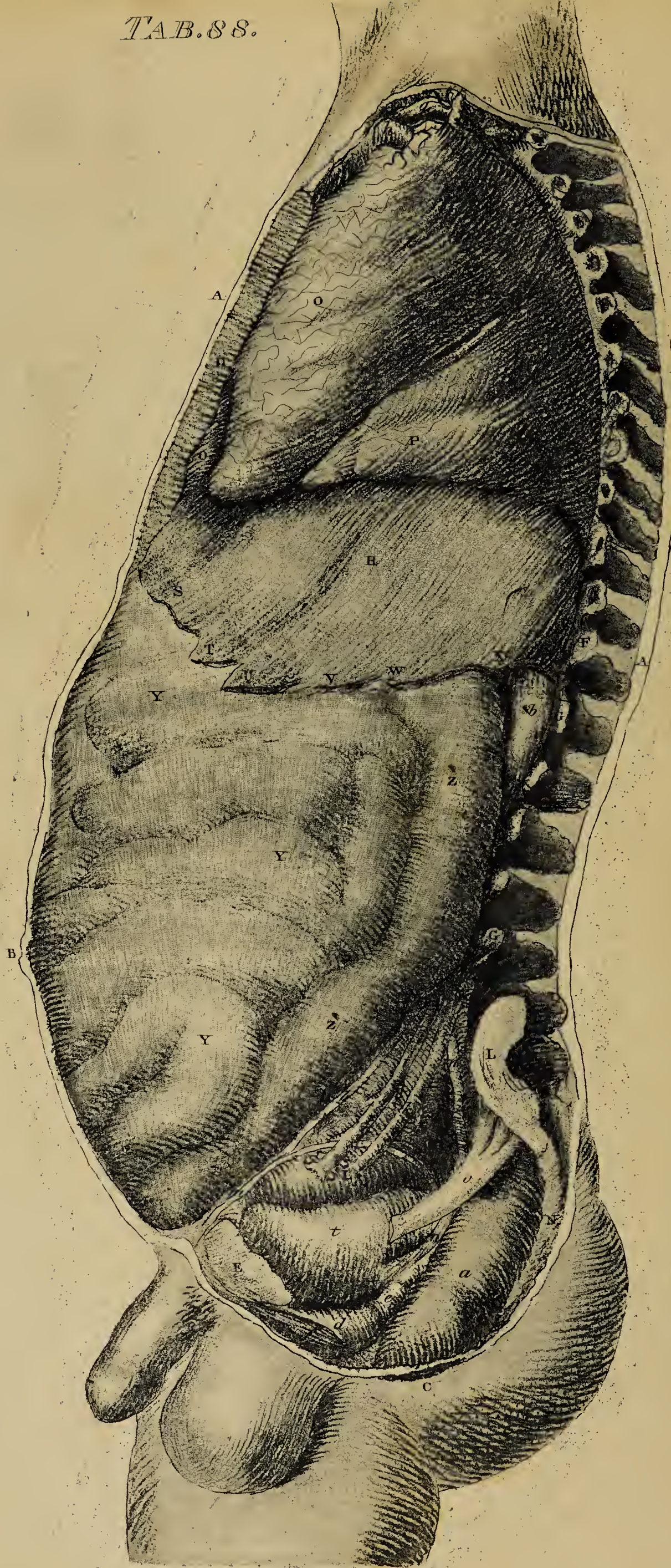
The Jejunum, Ilium, and right half of the Colon, are supplied by the Superior Mesenteric Artery; and the left half of the Colon with the Rectum, by the Inferior Mesenteric Artery.

The *Veins* of all the Intestines send their Blood to the Vena Portæ.

The *Absorbents* of the Intestines are large and numerous.—They arise from their inner Surface, and run in the Mesentery and Meso-colon, passing through their numerous Glands.—The Absorbents of the Small Intestines terminate in the Receptacle of the Chyle; those of the Large Intestines, which are smaller than the former, go partly to the Thoracic Duct, and partly to the Lymphatics of the Loins.

The *Nerves* of the Intestines are very small, yet numerous, and are derived partly from the Eighth Pair, but chiefly from the Great Sympathetics.

The Vessels and Nerves of the Omenta are Branches of those which supply the Stomach, and have the name of *Gastro-Epiploic*.



T A B L E LXXXVIII.

Represents a LATERAL VIEW of the NATURAL SITUATION of the THORACIC and ABDOMINAL VISCERA.

In this Figure, the Superior and Inferior Extremity are separated from the Trunk. A Longitudinal Incision is made through the middle of the Anterior and Posterior Parts of the Body, from the under part of the Neck, as far as the Pelvis. The Integuments, with the Muscles and Bones covering the Left Half of the Thorax, Abdomen, and Pelvis, are removed.

A, B, C, The cut edge of the integuments and muscles ;
—B, the umbilicus ;—C, the anus.

D, A section of the sternum.

E, The os pubis of the right side covered with cartilage.

F, F, The transverse processes of the dorsal vertebræ, with the pits to which the tubercles of the ribs were joined.

G, G, The transverse processes of the lumbar vertebræ.

H, H, The spinous processes of the dorsal vertebræ.

I, I, ————— lumbar vertebræ.

K, L, M, N, The os sacrum ;—L, The lateral surface incrusted with cartilage, which formed a connection between this bone and the os innominatum ;—N, The lateral part of the bone to which the sacro-sciatic ligament adhered.

O, P, The two lobes of the left lung dilated, and corresponding with the form of the thorax, so that the impressions of the ribs upon their surface, in some measure, appear. The great lobe extends to the sternum, and so embraces the pericardium, and accommodates itself to it, that only a small portion of that membrane appears.

Q, The under and fore part of the pericardium exposed.

R, S, T, U, V, W, X, The convexity of the diaphragm within the thorax, shewn by cutting the inferior part of the lung which descended between this muscle and the ribs ;—R, The fleshy left part covered by the pleura ;—S, The extremity which is inserted into the cartilage of the seventh rib ;—T, That which adheres to the cartilage of the eighth rib ;—U, That which ad-

heres to the osseous and cartilaginous portions of the ninth rib ;—V, That which is joined to the tenth rib and its cartilage ;—W, That which was inserted into the osseous part of the eleventh rib, nearer its cartilage ;—X, That which was fixed to the twelfth rib and its ligament.

Y, Y, Y, The small intestines faintly appearing through the peritoneum covering them.

Z, Z, The colon inclosed in the same membrane, descending to the sigmoid flexure ; then ascending towards the middle of the os sacrum before it forms the intestinum rectum.

a, The intestinum rectum proceeding to the anus.

b, The left kidney placed on the outside of the peritoneum. It is partly covered by the inferior portion of the diaphragm, and lies upon the transverse processes of the two uppermost lumbar vertebræ.

c, The vesica urinaria, a little distended with fluid, situated on the outside of the peritoneum, yet so that the peritoneum covers the upper part of it.

d, The prostate gland.

e, Part of the left vesicula seminalis projecting above the prostate gland, and situated between the vesica urinaria and intestinum rectum.

f, The left crus of the penis, separated from the corresponding crus of the os ischium.

g, The subclavian artery tied and cut across.

h, The corresponding vein.

i, The left iliac artery.

k, The concomitant vein.

l, The spermatic cord.

m, The vas deferens receding from the spermatic blood-vessels, and running towards the back-part of the bladder, to terminate in the vesicula seminalis.

n, n, The ureter, with its termination in the lateral part of the bladder.

o, The sciatic nerve.

The iliac and spermatic vessels, and the sciatic nerve, are a little displaced in removing the os innominatum.

T A B L E.

T A B L E LXXXIX.

A VIEW of PARTS deeper seated than those seen in the preceding FIGURE.

THE Lateral Portion of the Diaphragm, over the Liver, Stomach, and Spleen, is cut off. The Left Lung is turned towards the Spine, that its Concave Surface which accommodates itself to the Pericardium, the bare Surface of the latter, and the Vessels proceeding from the Heart, may appear. The Kidney is raised from its place. The Iliac and Spermatic Vessels, the Ureter and Sciatic Nerve, and the Peritoneum covering this side of the Intestines, are dissected away, by which the Intestines and Omentum are brought into view.

A, B, C, The pericardium containing the heart and origins of the vessels ;—A, the apex and left ventricle of the heart appearing through the pericardium ;—B, the left auricle also somewhat conspicuous ;—C, the pulmonary artery.

D, The arch of the aorta, after emerging from the pericardium.

E, The arteria innominata LOWERI, and,

F, The left carotid artery arising from the aorta.

G, H, The arteria, and vena subclavia.

I, One of the four pulmonary veins which terminate in the left auricle of the heart.

K, The left lung turned towards the spine in such a manner, that what is naturally concave and embracing the pericardium, appears here convex.

L, A portion of the diaphragm left *in situ*, after removing its lateral part ; shewing how much it ascends into the cavity of the thorax.

M, The left part of the liver lying over the stomach.

N, O, The stomach a little distended with aliment ;—N, The sacculus cæcus fundus ventriculi.—O, The great arch or curvature.

P, The spleen, the figure of which in this subject was almost quadrangular. It is convex externally, and

concave internally, where it is accurately applied to the stomach.

Q, R, S, T, The omentum majus ;—S, the gastrophilus descending from the great arches of the stomach and colon over the small intestines,—very thin, and without fat.

Q, R, U, V, W, X, The great intestine ;—Q, R, U, The transverse part of the great intestine, termed *colon transversum*, and *zona coli*, running under the stomach and spleen to the last transverse process of the back, and first of the loins ;—V, V, The left part of the great intestine, or the *colon sinistrum*, descending near the lumbar vertebræ and os ilium ;—W, The inferior part of the colon sinistrum, or the bottom of the sigmoid flexure ascending a little, and reaching the middle of the upper part of the os sacrum ;—X, The extremity of the colon termed *rectum*, proceeding along the os sacrum and os coccygis to the anus.

Y, Y, Y, One of the three ligaments which extends along the colon, from the intestinum cæcum as far as the beginning of the rectum.

Z, Part of the meso-colon, through which the small intestines appear.

S, T, a, a, The convolutions of the small intestines partly covered by the omentum.

b, The vesica urinaria somewhat distended with fluid, placed between the os pubis and intestinum rectum.

c, The prostate gland situated at the lower part of the bladder of urine.

d, The vesicula seminalis of the left side.

e, The ureter dissected a little from the bladder.

f, The left crus penis separated from the corresponding crus of the os ischium.

g, The place which the kidney of this side occupied, partly filled by the colon, though the true situation of it still appears.

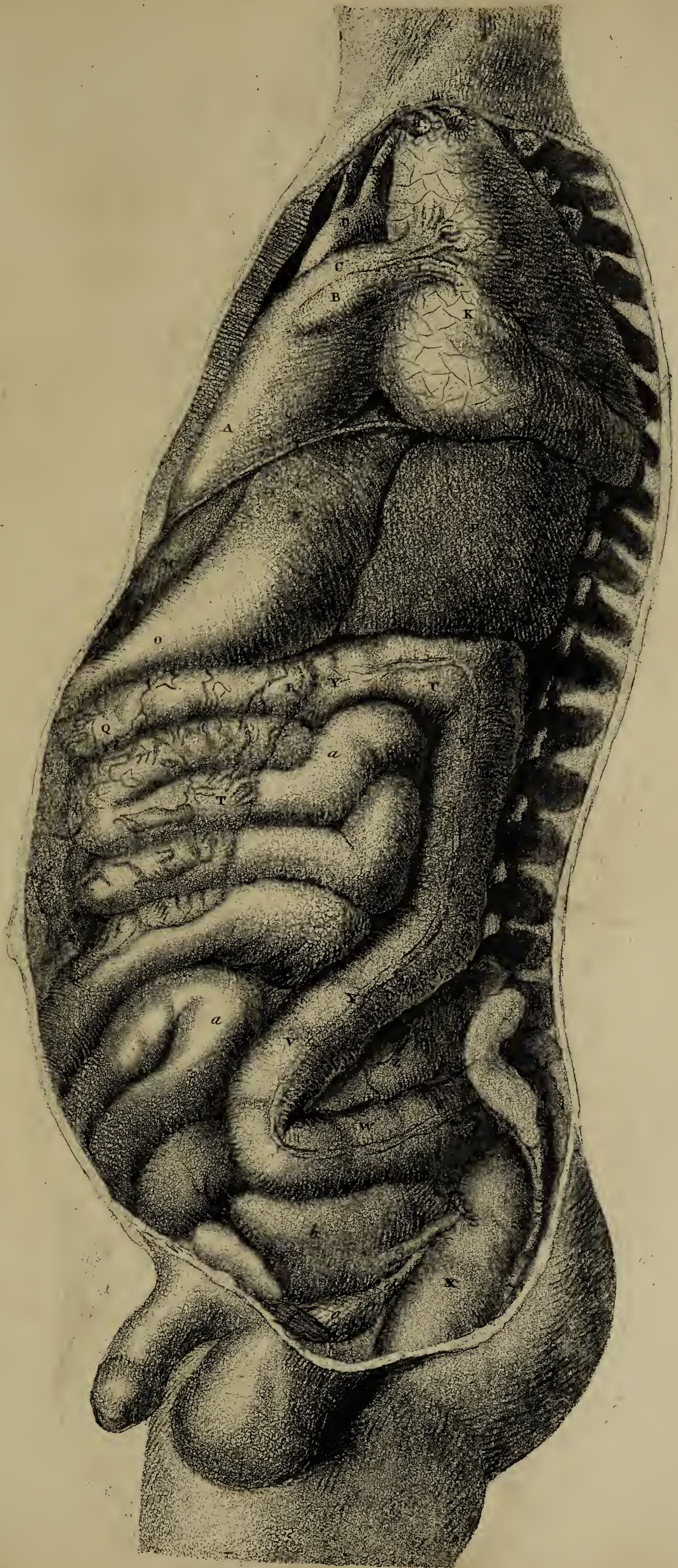


Fig. 1.



Fig. 2.



T A B L E X C.

VIEWS of the OMENTUM.

FIG. 2.

Represents the OMENTUM MAJUS, and that Part of it called GASTRO-COLICUM.

- A, A, The liver turned upwards.
a, The gall-bladder, shorter than the liver, as is usual in children.
b, The umbilical vein and fossa.
B, The *Lobulus SPIGELII*, appearing through the omentum minus.
c, The large curvature of the stomach, appearing through the inflated omentum.
d, The right gastro-colic artery and vein.
e, The seat of the pylorus.
f, The point of the spleen, projecting between the stomach and colon.
g, A ligament produced from the peritoneum, which supports the spleen.
C, *C*, &c. The omentum majus, or gastro-colicum.
h, A line separating the omentum from the meso-colon.
i, *i*, The origin of the omentum gastro-colicum from the anterior curvature of the stomach, from which the anterior lamina is produced.
k, *k*, A line pointing at the origin of the omentum majus from the colon, or the lamina posterior.
l, The left blind termination of the omentum.
m, *m*, The *Omentum Minus* of WINSLOW, or *membrana macilentior*.
n, The *Omentum Colicum* of HALLER, which is an appendix of the omentum majus.
o, Part of the meso-colon.
D, *D*, The convolutions of the small intestines.
E, The containing parts of the abdomen turned back.
F, *F*, The thighs.

FIG. 1.

Shews all the PARTS seen in Fig. 2. but the OMENTUM MAJUS collapsed on each side, and the INTESTINUM CO-

LON pulled a little downwards, to obtain a View of the FORAMEN of WINSLOW.

- A, The liver turned upwards;—the letter is placed upon the lobus anonymus.
B, The gall-bladder.
a, The umbilical vein.
C, The stomach almost empty.
D, The *Lobulus SPIGELII*, appearing through the omentum minus.
b, The pylorus, from which the first turn of the duodenum passes upwards and backwards.
c, The omentum gastro-colicum collapsed.
d, *d*, A line marking the connection of the omentum gastro-colicum and colicum with the colon.
e, *e*, The *Omentum Minus* of WINSLOW.
f, *f*, The transverse part of the duodenum appearing through the meso-colon.
E, *E*, *g*, *g*, Various parts of the colon;—*E*, *E*, Its great arch.
h, Part of the duodenum, upon which the gall-bladder rests.
i, The descending part of the duodenum, into which the biliary and pancreatic ducts enter.
k, The ligamentum hepatico-colicum, formed of membranes passing from the gall-bladder and liver across the duodenum, giving an external covering to it, and connected with the colon.
l, The ligamentum hepatico-renal.
m, The right kidney, a small part of which is covered by the peritoneum.
n, The *Meatus*, or *Foramen WINSLOWI*, between, *k*, the ligamentum hepatico-colicum, and, *l*, the hepatico-renal.
o, The colon, with its *appendiculæ pinguedinosæ*.
F, *F*, *F*, The convolutions of the small intestines.
G, *G*, *G*, The containing parts of the abdomen cut and reflected.

TABLE

T A B L E XCI.

Represents the LIVER and STOMACH, &c. of their natural size, the former being turned a little upwards.—The relative situation of the STOMACH is not preserved, being drawn a little to the right side, on account of the smallness of the Plate.

-
- | | |
|---|--|
| A, The concave or under surface of the great lobe of the liver. | <i>b, b, b</i> , The large curvature of the stomach. |
| B, A small part of the convex or upper surface of the liver. | <i>c, c</i> , The omentum minus. |
| C, The concave or under surface of the small lobe of the liver. | <i>d</i> , The point of the Lobulus Spigelii. |
| D, Part of the ligamentum latum. | <i>e, e, e</i> , The superior coronary vessels, sending numerous branches to the stomach. |
| E, The gall-bladder. | <i>f, f, f</i> , The inferior coronary vessels, also sending numerous branches to the stomach, and to the omentum majus. |
| F, The cystic duct. | <i>g, g, g</i> , The beginning of the omentum majus. |
| G, G, G, G, The sinus portarum. | <i>h</i> , The large or left extremity of the stomach. |
| H, The hepatic duct. | <i>i</i> , The small or right extremity of the stomach. |
| I, The ductus communis choledochus. | <i>k</i> , The cardia, or upper orifice of the stomach. |
| K, The hepatic artery. | <i>l</i> , The pylorus, or under orifice of the stomach, with a small part of the duodenum surrounding it. |
| L, The vena portæ. | <i>m</i> , The anterior edge of the spleen. |
| <i>a, a, a</i> , The small curvature of the stomach. | |

TABLE





FIG. 2.



FIG. 3.



FIG. 7.



FIG. 6.



FIG. 8.

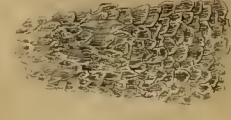


FIG. 4.

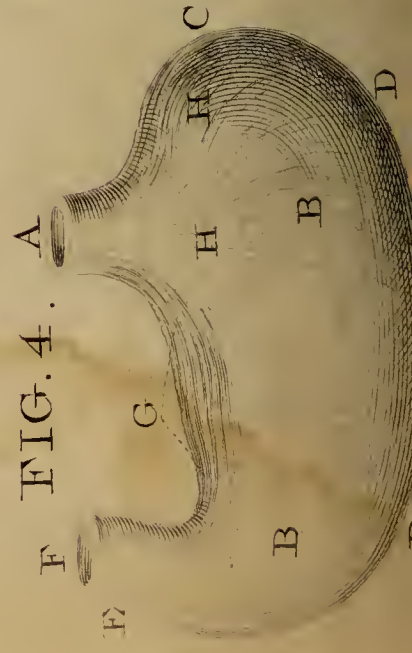


FIG. 5.

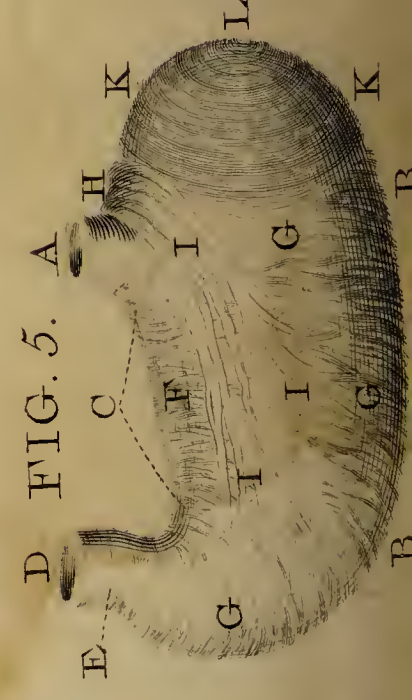


FIG. 9.



FIG. 10.





FIG. II.

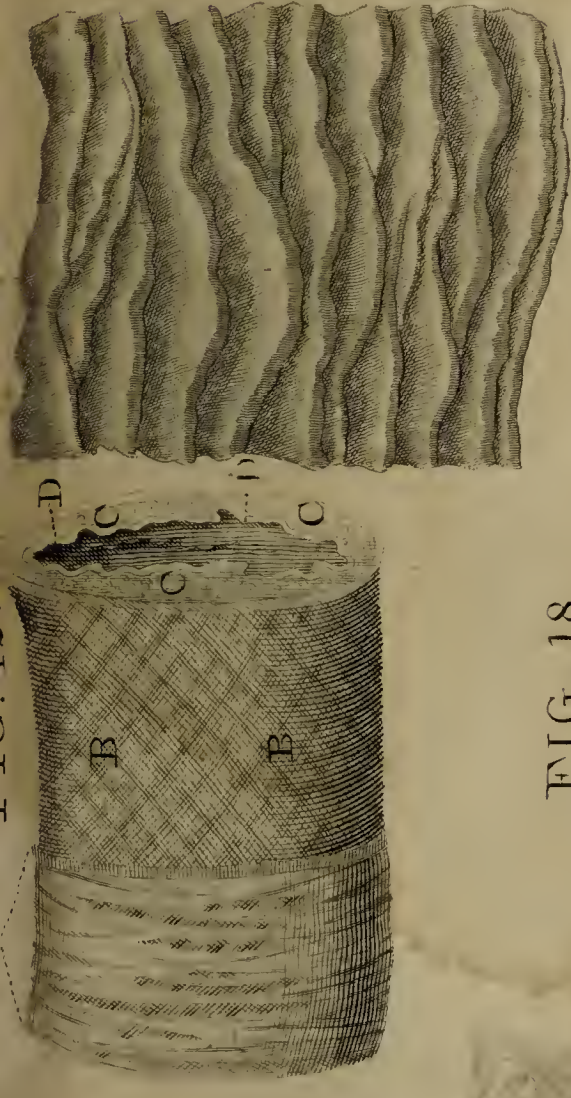


FIG. 12.

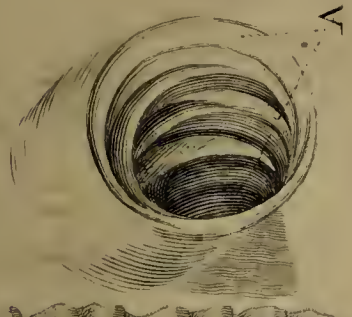


FIG. 13.

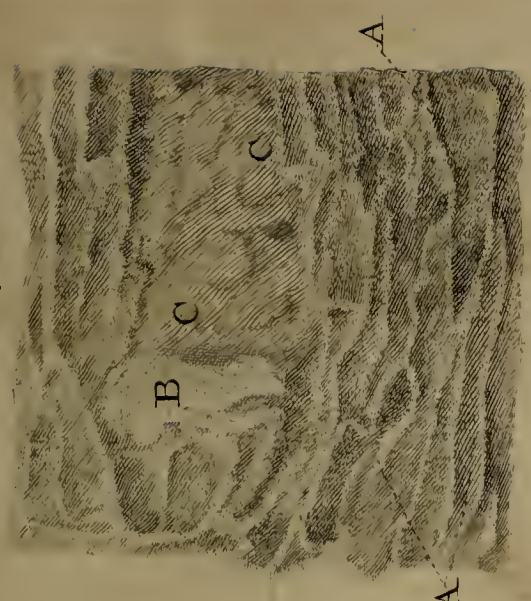


FIG. 14.

FIG. 20.



FIG. 18.

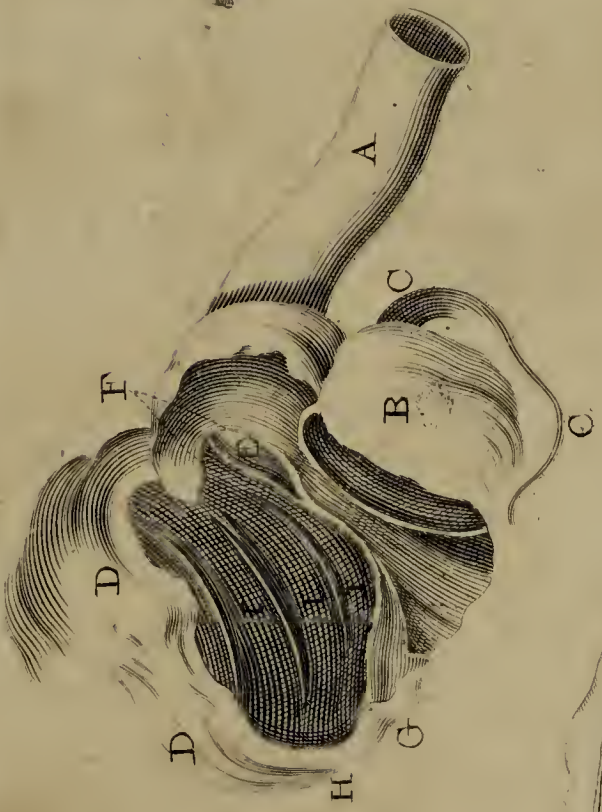


FIG. 15.



FIG. 19.

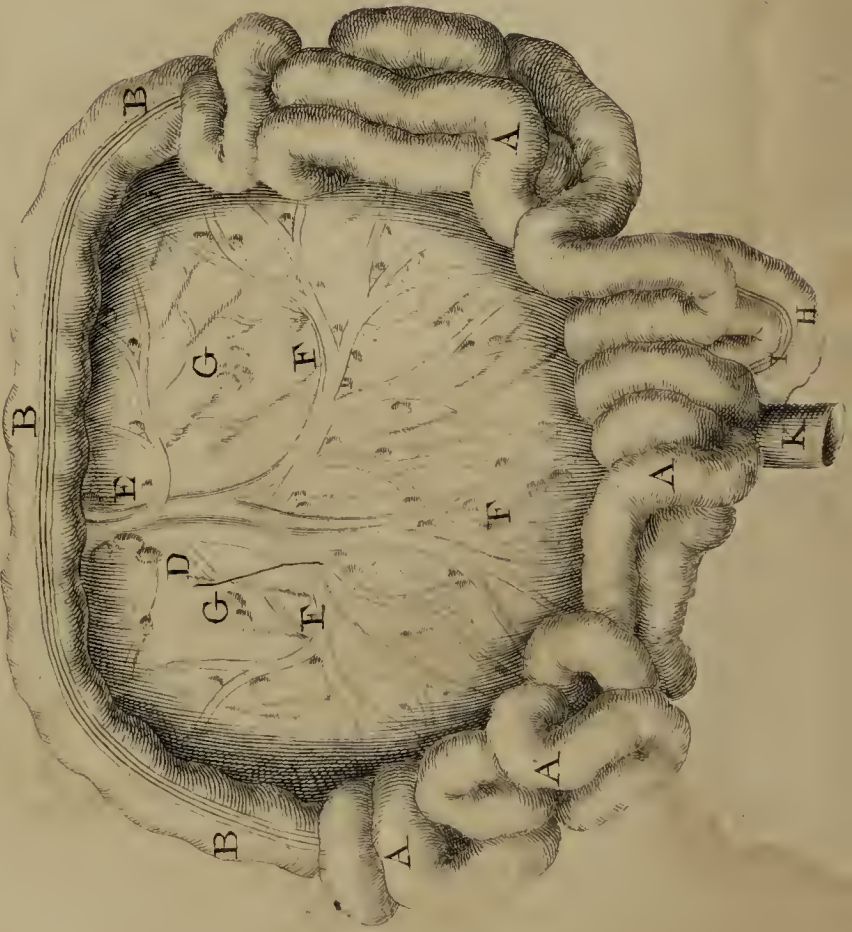


FIG. 17.

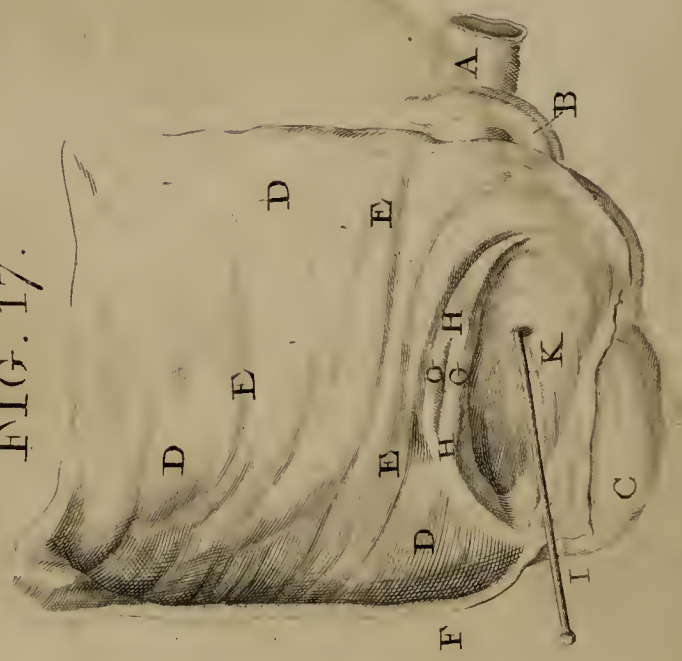
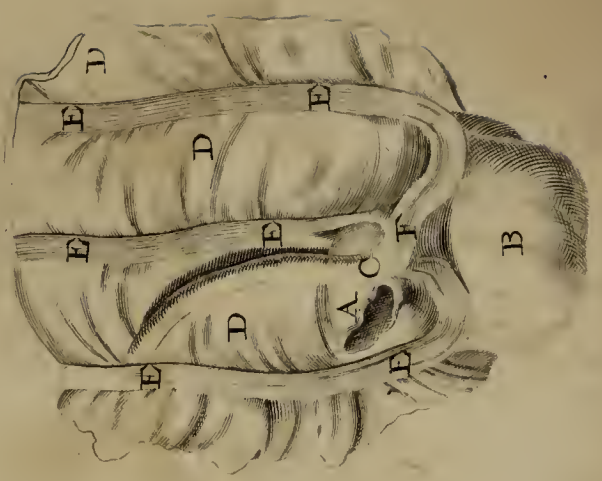


FIG. 16.



T A B L E X C I I .

Represents the CHYLOPOIETIC and ASSISTANT-CHYLOPOIETIC VISCERA, with the STRUCTURE of the ALIMENTARY CANAL.

FIG. 1.

Shews the CHYLOPOIETIC and ASSISTANT-CHYLOPOIETIC VISCERA, taken out of the BODY.

- A, A, A, The concave part of the liver turned up,
 B, The ligamentum rotundum ;
 C, Its passage under,
 D, The isthmus of the liver.
 E, The vena portæ.
 F, The arteria hepatica.
 G, The ductus hepaticus.
 H, The gall bladder.
 I, The ductus cysticus.
 K, The ductus communis choledochus. The rest of the viscera are placed in the same manner as when in the body.
 L, The great, or left extremity of the stomach.
 M, M, M, The great curvature, and gastro-epiploic vessels, the branches of which are represented too large.
 N, N, The small curvature.
 O, The small extremity of the stomach, and seat of the pylorus.
 P, The duodenum.
 Q, The spleen.
 R, S, S, The convolutions of the jejunum and ilium.
 T, The intestinum cæcum.
 U, U, U, U, The colon, along which one of its muscular ligaments is seen.
 V, V, V, The meso-colon, with its blood-vessels and glands.
 W, X, The sigmoid flexure of the colon; with the ligament continued.
 Y, Y, The intestinum rectum.
 y, y, y, The three ligaments of the colon expanding upon the rectum.
 Z, Z, The levatores ani.
 &, The anus, surrounded by the sphincter ani.
 The white spot above the sphincter ani points out the seat of the prostate gland.

FIG. 2.

A View of the Fore-part of the ESOPHAGUS, and Upper and Fore part of the STOMACH.

- A, F, The esophagus.
 A, A section of it immediately below the pharynx.
 VOL. II.

- B, The cellular coat.
 C, The inner transverse muscular fibres.
 D, The outer longitudinal muscular fibres.
 F, The cardia.
 G, The stomach ;
 H, Its great or left extremity ;
 I, I, I, Its great or anterior curvature ;
 K, K, Its small or posterior curvature ;
 L, The small or right extremity :—The letter also points out the situation of the pylorus, and beginning of the duodenum.
 M, Part of the external or peritoneal coat, separated and turned back, to shew,
 N, Part of the second or muscular coat.
 O, P, The continuation of the external membrane of the stomach, forming the omentum minus, &c.

FIG. 3.

A View of the STOMACH, with Part of the ESOPHAGUS and the OMENTUM of a CHILD.

- A, A portion of the esophagus, with its external longitudinal muscular fibres.
 B, The cardia.
 C, C, The superior-anterior surface of the stomach.
 D, The great or left extremity.
 E, The small extremity.
 F, The stomach, tied at the pylorus.
 G, G, The great curvature.
 E, B, The small curvature, upon which are seen branches of the superior coronary artery.
 H, The right epiploic gastric artery, sending off principal branches which plunge immediately into the substance of the stomach, and others which take a long course, and divide into innumerable branches upon the omentum majus.
 I, Branches of the splenic artery, termed *Arteriæ Breves*, supplying this part of the stomach and the omentum.
 K, K, K, The omentum majus.

FIG. 4.

Represents the EXTERNAL MUSCULAR FIBRES of the STOMACH, after the PERITONEAL COAT has been removed.

- A, The cardia.
 B, B, The superior-anterior surface of the stomach ;
 C, The

- C, The left extremity ;
 D, D, The great arch.
 E, The pylorus.
 F, The beginning of the duodenum.
 G, A bundle of muscular fibres continued from the esophagus, along the small curvature of the stomach, towards the duodenum.
 H, H, Muscular fibres from the esophagus, which spread out upon the anterior surface of the stomach, and run to its right extremity.

FIG. 5.

Muscular Fibres of the Stomach, deeper seated than those in the former Figure. They are seen collected into Bundles, which run in different directions.—The letters referring only to the direction of these Fibres, need no explanation.

FIG. 6.

A Portion of the Stomach inverted, to shew its Rugæ. In this Figure, innumerable Pores are likewise represented.

FIG. 7.

A Portion of the Stomach inverted, cut off above the Pylorus.—In the Upper Part of the Figure, instead of Rugæ, little Prominences appear ; in the Under Part, the Interstitial Cells are shewn.

FIG. 8.

A Portion of the Stomach, with the Interstitial Cells magnified,—the Peritoneum having been removed.

FIG. 9.

The Right Side of the STOMACH distended and dried, to shew the PYLORUS.

- A, The right side of the stomach.
 B, B, A section of the beginning of the duodenum.
 C, The pylorus placed somewhat obliquely, surrounding the passage from the stomach to the duodenum.

FIG. 10.

Represents the Pylorus in the natural state, in which it is more contracted than when distended and dried.

FIG. 11.

A Portion of the SMALL INTESTINE, to shew its COATS.

- A, The peritoneal coat.
 B, The muscular coat, composed of longitudinal and transverse fibres, the peritoneal coat being supposed to be removed.
 C, The muscular coat, raised to shew,

- D, The cellular coat, which is here represented too uniformly checkered.

FIG. 12.

Gives another View of the Muscular and Cellular Coats of Intestines, but upon a larger scale than FIG. 11.

FIG. 13.

A Portion of the INTESTINUM JEJUNUM.

- A, The valvulæ conniventes, as they appear in a dried preparation.

FIG. 14.

The Inner Surface of a Portion of the INTESTINUM JEJUNUM.

- A, A, The tunica villosa, lining the valvulæ conniventes.
 B, A portion of the villous coat, raised to shew the nervous or cellular coat.
 C, C, The cellular coat, in which, after the villous has been removed, nothing but the vestiges of the valvulæ conniventes appear.

FIG. 15.

A Portion of the Intestinum Jejunum of a Child, inverted and inflated, to shew the Mucous Glands, which are placed partly on, and partly between the Valvulæ Conniventes.

FIG. 16.

Represents the INTESTINUM CÆCUM, and part of the COLON, slit open along the right side, then spread out, and viewed Exteriorly, to shew the rise of the three LIGAMENTS of the COLON.

- A, The termination of the intestine ilium in the cæcum.
 B, That part of the intestines which was considered as the true cæcum by the ancients.
 C, The appendix vermiformis drawn upwards, to shew,
 E, E, E, &c. The three ligaments of the colon beginning from it.
 D, D, The outer surface of the intestine.

FIG. 17.

An Inner View of the same Part of the INTESTINE as that seen in the former Figure.

- A, The ilium, cut across near its termination in the cæcum.
 B, The appendix vermiformis brought into view.
 C, The beginning of the cæcum entire.
 D, D, D, The inner surface of the cæcum, and part of the colon.

E, E, E, The

E, E, E, The cells of this part of the gut;
 F, Its cut edge.
 G, G, The end of the ilium projecting into the cæcum,
 and forming the valve of the colon.
 H, H, The fræna, or retinacula of the valve.
 I, A probe put into the orifice of the appendix vermi-
 formis.
 K, The cavity of the cæcum of the ancients.

FIG. 18.

*A Portion of the INTESTINUM ILIUM, the CÆCUM, and
 Part of the COLON, with the VALVULA COLI.*

A, The ilium ascending obliquely, and passing into the
 left side of the cæcum.
 B, Part of the cæcum entire.
 C, The appendix vermiformis turned upwards.
 D, D, D, Part of the cæcum and colon laid open.
 E, The aperture of the valve of the colon.
 F, F, H, Membranes supporting the valve, called its *re-
 tinacula*.
 G, The lower part of the valve.
 I, I, The cells of the colon.

FIG. 19.

Shews the MESENTERY, with the ARTERIES, VEINS, ME-

*SENTERIC GLANDS, and INTESTINES, turned aside, ac-
 cording to the course of the MESENTERY.*

A, A, The intestinum, jejunum, and ilium, spread out.
 B, B, The colon turned up, one of the ligaments of
 which is seen.
 D, E, F, G, The mesentery expanded.
 D, E, The superior mesenteric vein and artery.—Upon
 the mesentery are seen little dark-coloured spots, which
 represent its glands.
 H, The sigmoid flexure of the colon.
 I, One of its ligaments.
 K, The rectum.

FIG. 20.

*A Portion of the SMALL INTESTINE and MESENTERY,
 with the LACTEAL VESSELS.*

A, A, Part of the jejunum, through which its rugæ
 slightly appear.
 B, B, The lacteals, which the Author of the figure says
 he found much more numerous than are here repre-
 sented.

FIG. 21.

*Part of the INTESTINUM JEJUNUM inverted, to shew the
 VALVULÆ CONNIVENTES as they appear when suspended
 in Water, or in diluted Spirit of Wine.*

OF THE LIVER.

THE *Liver* is a large solid Mass, of a dusky red colour, situated immediately *under* the Diaphragm, extending downwards to the margin of the Thorax, but not going beyond it.

It is placed partly in the right hypochondrium, which it in a great measure fills, and partly in the Epigastrium, reaching over a little way into the left Hypochondrium. Tab. LXXXVI. Fig. 2. P, Q.

It is *convex* and very *smooth* on the upper Surface, where it is opposed to the Diaphragm, though a little flattened on the upper part of its left side, where it is placed opposite to the Heart.

It is *irregularly concave* on the under side, where it rests upon the Stomach and Intestines, and is perforated by several large Blood-vessels.

It is *thick* on its right and posterior part, and becomes gradually *thinner* towards the left side; is *obtuse* or *blunt* on its posterior, and *acute* or *sharp* on its anterior edge, —and considerably broader from one side to the other, than from before backwards.

It is divided into *Prominences* or *Lobes*, two of which, called *Great* and *Small*, or *Right* and *Left Lobes*, are so considerable as to form the Body and whole upper part of the Liver:—The other Lobes, which are very inferior in size, are placed upon the under side of the former.

The *Great Lobe* is situated obliquely in the Right Hypochondriac Region, following the Curve of the Diaphragm, and rests upon the Pylorus, Colon, and top of the Right Kidney. Tab. LXXXVI. Fig. 1. G.

The *Small Lobe*, distinguished from the Great one by a Broad Ligament, is placed almost horizontally, chiefly in the Epigastric, only a small portion of it lying in the Left Hypochondriac Region. Tab. LXXXVI. Fig. 2. L. Left Side.

The other Lobes are,

The *Lobulus SPIGELII*, which is small when compared with the two former Lobes, but is the principal one below.

It is situated near the Spine, upon the left side of the Great Lobe, and is of a Pyramidal form, projecting like a Nipple, at the small Curvature of the Stomach. Tab. XCIII. Fig. 2. N.—Tab. XC. Fig. 1. D.

The *Lobulus Caudatus*, which is merely the root, or one of the angles of the Lobulus SPIGELII, advancing towards the middle of the lower side of the Great Lobe.

The *Lobulus Anonymus*, or *Quadratus*, which is placed between the passage of the Round Ligament and the Gall-bladder, and is less prominent, but broader than the former Lobule. Tab. XC. Fig. 1. A.—Tab. CCI. D, B.

From the Lobulus Anonymus, a Bridge called *Pons* or *Isthmus Hepatis*, runs across the passage for the round Ligament, to be joined to the Left Lobe;—It is sometimes a-wanting. Tab. CCI.

Upon the under side of the Liver, there are several *Fissures*, of which the following are the principal.

The *Great Fissure*, called *Fossa Umbilicalis*, between the Right and Left Lobes, at the under and fore part of the Liver.

This is terminated by a *Notch* at the fore-part of the Liver,—of different depths in different Bodies;—and behind, it is commonly covered with the Bridge above mentioned. Tab. CCI. B, L.

The *Principal Fissure*, termed *Sulcus Transversus*, or *Sinus Portarum*, extending from right to left, between the Great and Small Lobes, and bounded by these Lobes at its extremities, and by the Lobulus Anonymus before, and the Lobulus SPIGELII behind; the two latter forming parts compared by the Ancients to a Gate, and therefore called *Porta*. Tab. XCIII. Fig. 2. R, R, R.

The *Depression* between the Great Lobe and Lobulus SPIGELII, for the passage of the Inferior Vena Cava, which has frequently a Bridge over it, forming it into a Canal. Tab. XCIII. Fig. 2.

A *Small Depression*, called *Fossa Ductus Venosi*, between the Left Lobe and Lobulus SPIGELII, running a little obliquely from right to left side, and receiving a Ligament, formerly a Branch of the Umbilical Vein in the Fœtus. Tab. XCIII. Fig. 2.

The Liver is connected to the Body by different *Processes*, termed its *Ligaments*; all of which, excepting one, are formed by Doublings of the Peritoneum, viz.

The *Ligamentum Latum*, or *Suspensorium Hepatis*, placed between the Right and Left Lobes above, and extending below into the Fossa Umbilicalis. Tab. LXXXVI. Fig. 1. I.

It is fixed obliquely to the Diaphragm and Tip of the Eniform Cartilage, and then descends in the same oblique direction, adhering to the inner part of the Vagina of the Right Rectus Abdominis, as far as the Umbilicus.

The *Ligamentum Rotundum*, which was the Umbilical Vein in the Fœtus, placed in a Doubling at the under part of the Ligamentum Latum, and fixed to the Umbilicus. Tab. LXXXVI. Fig. 1. L.

These two Ligaments have been supposed to resemble a *Falx*, with the edge turned uppermost, from which circumstance the Ligamentum Latum is sometimes also called *Falciforme*.

The *Ligamentum Dextrum*, or *Right Lateral Ligament*, which is short, and connects the back part of the right extremity

extremity of the Great Lobe to the Diaphragm. Tab. XCIV. Fig. 4. E.

The *Ligamentum Sinistrum*, or *Left Lateral Ligament*, which is longer than the former, and connects the left extremity of the Small Lobe to the Diaphragm. Tab. XCIV. Fig. 4. C.

The *Ligamentum Coronarium*, considered by some as merely Cellular Substance, and by others as a Reflection of the Peritoneum, or both.—It unites the root of the Liver to the Tendinous Portion of the Diaphragm.

Besides the Ligaments already mentioned, two others are described by Haller; one called *Hepatico-colicum*, Tab. XC. Fig. 1. *k*. which passes from the Gall-bladder and contiguous Sinus Portarum, across the Duodenum, to the Colon;—another called *Hepatico-renale*, Tab. XC. Fig. 1. *l*. which descends from the root of the Liver to the Kidney.—These, as well as the other ligaments of the Liver in general, are productions of the Peritoneum.

The Ligaments of the Liver preserve it in its proper situation, and of course prevent it from inclining too much in any direction.—The Stomach and Intestines support it when the Body is upright, and the Diaphragm when the Body is inverted.

The Liver has a simple Coat adhering closely to it, which it derives from the Peritoneum, and is every where covered by this Membrane, excepting behind, where it adheres to the Diaphragm by Cellular Substance.

The Substance of the Liver is composed of several kinds of Vessels, the extreme Branches of which are intermixed in such a manner, as to form numberless Pulpy Corpuscles, named *Acini*, which, when minutely examined, are observed to be composed of Vessels in the form of radiated *Villi* or *Penicilli*.

The *Vessels* of the Liver are, the *Hepatic Artery*, *Vena Portarum*, *Venæ Hepaticæ*, *Absorbents*, and *Biliary Ducts*.—It has likewise numerous *Nerves*.

The Trunks of the Hepatic Artery, Vena Portæ, Biliary Ducts, and Nerves, with the Absorbents and Lymphatic Glands of the Liver, form a large *Cord* at its under part.

The Artery is situated in the left part of the Cord, the Vein in the right, with the Trunk of the Biliary Ducts before it;—the Nerves and Lymphatics surrounding the great Vessels. Tab. XCIII. Fig. 2.—Tab. CCI.

The Cord of Vessels and Nerves is intermixed with much Cellular Substance, and covered externally by a Reflection of the Peritoneum, which has obtained the name of *Capsule of GLISSON*.

The Branches of Vessels and Nerves accompany each other through the Substance of the Liver, forming small *Fasciculi*, in a manner somewhat similar to the *Fasciculus* of which the Cord is formed by their Trunks.

In their course through the Liver, the Branches of the different Vessels and Nerves, but particularly those of the Vena Portæ, are inclosed in a large portion of Cellular

Substance, which is also frequently called *Capsule of GLISSON*, from that Author supposing it to be a continuation of the Capsule which covers the Vessels before they enter the Liver.

The *Hepatic Artery* is derived from the Cœliac, Tab. XCIII. Fig. 2. Y, and is dispersed throughout the whole Substance of the Liver, and also upon the Coat which covers it, and is so small, when compared with the bulk of the Liver, as to have been generally supposed to be destined for the nourishment merely of that Viscus; but from Injections passing from the Artery to the Biliary Ducts, and from other causes, it has been supposed by some Anatomists, that the Hepatic Artery is not only intended to nourish the Liver, but is capable of secreting part of the Bile;—and this supposition is farther confirmed, from the Vena Portæ having, in a recent case, been found a-wanting, while, at the same time, the Hepatic Artery was larger than usual, and the Veins, which commonly form the Vena Portæ, terminated in the Vena Cava.

The *Vena Portæ* is named from its situation with respect to the Porta of the Liver. Tab. XCIII. Fig. 2. Z.

It partakes of the nature of an Artery and a Vein:—Like the former, it carries the Blood from the Trunk to the Branches, and, like the latter, it carries it to the Heart;—or it is peculiar in the Blood flowing in one part from the Branches to the Trunk, and in another from the Trunk to the Branches.

It is formed by the Veins of the Stomach and Intestines, joined to those of the Spleen, Omentum, and Pancreas, and approaches to the nature of an Artery in the thickness of its Coats, though it has no Pulsation.

It passes to the Porta, where, from its great size, it is named *Sinus Venæ Portæ*, and divides into Branches which accompany those of the Artery in their course through the Substance of the Liver, terminating at last in the Pulpy Corpuscles.

The *Vena Portæ* serves to carry Venous Blood to the Liver, for the secretion of the Bile.

The *Venæ Hepaticæ* are numerous. They are reflected partly from the extremities of the Artery, and partly from those of the Vena Portæ. They unite by degrees, and accompany the other two Sets of Vessels; but, at the root of the Liver, they form two or three large Trunks which terminate in the Vena Cava, where it is about to perforate the Diaphragm. Tab. LXXXV. U, U, U. They likewise send off some small Branches which terminate in the Cava, where that Vein lies behind the Liver.

The *Venæ Hepaticæ* receive the Blood from the Hepatic Artery and Vena Portæ, after the Bile has been secreted, and return it to the Vena Cava, to be conveyed by it to the Heart.

The *Lymphatics* of the Liver are so numerous as to cover almost the whole of its outer Surface. Tab. CLXXVII. Fig. 1. I, K. They discharge their Con-

tents

tents, partly into the beginning of the Thoracic Duct, and partly into a Plexus situated behind the Sternum.

The *Nerves* of the Liver are also numerous. They arise from the Great Sympathetics and Eighth Pair, and accompany the Blood-vessels. Tab. CCI.

The *Biliary Ducts*, Tab. XCIII. Fig. 2. T, U, V, W. arise by extremely minute Branches, termed *Pori Bilarii*, or *Tubuli Biliferi*, chiefly from the extremities of the Vena Portæ, in the Substance of the Corpuscles, through the whole of the Liver.

The *Pori Bilarii* run in company with the Branches of the Artery and Veins, and unite into larger and larger Branches, which afterwards go into two, and these again into a single Trunk in the Sinus Portarum, called *Ductus Hepaticus*.

The *Ductus Hepaticus* serves to carry the Gall or Bile, which is of a yellow green colour, from the Liver,—and to convey it by the power of the Heart, Hepatic Artery, and Vena Portæ, assisted by the pressure of the surrounding Muscles, to the Duodenum, and partly to the Vesicula Fellea.

The *Vesicula*, or *Cystis Fellea*, or *Gall-bladder*, is a small, oblong, Pyriform Bag, consisting of a Fundus, Body, and Cervix, situated upon the concave side of the Great Lobe of the Liver, and placed in a transverse direction from behind forwards. Tab. LXXXVI.—Tab. XCI. E.

It extends from the Sinus Portarum, where the Cervix is situated, to the anterior edge of the Liver, and, when full, advances beyond the edge of the Liver, so as sometimes to have its Fundus opposed to the soft parts of the Abdomen, under the edge of the False Ribs.

The Fundus is a little lower than the Cervix, when the Person is in the erect posture. It then also inclines a little to the right side, and rests upon the Colon at the beginning of the Duodenum.

It is composed of several *Coats*, the *external* of which is a continuation of the Membrane of the Liver: This, however, is only a partial Coat covering that part of the Gall-bladder which projects beyond the Surface of the Liver.—It serves to give strength to the Gall-bladder, and to fix it to the Liver.

Under the former Coat, a few pale scattered Fibres, running in various directions, are sometimes observed, which have been considered as a *Muscular Coat*; and under this there is some Cellular Substance, which has obtained the name of *Nervous Coat*.

The *Inner Coat*, sometimes called *Villous*, is full of Reticular Rugæ or Folds, which become extremely minute towards the Cervix, where they run in a longitudinal direction. Tab. XCIV. Fig. 5.

The Surface of this Coat is every where perforated by the Ducts of small Follicles, which discharge a Viscid Mucus, to defend the Surface of the Inner Coat from the Stimulant nature of the Bile.

The Gall-bladder is connected through its whole

length to the Liver by Cellular Substance, Blood-vessels, and Absorbents.

In many brute-animals, the Gall-bladder is connected to the Liver also by a Set of Ducts, called *Hepato-cystic*, which convey the Bile found in the Gall-bladder immediately from the Liver. No such Ducts, however, are demonstrable in the Human Body, though, in former times, the contrary has been maintained by different Authors.

The Gall-bladder has Blood-vessels, Absorbents, and Nerves, in common with those of the Liver.—Its Veins pass into the Vena Portæ.

The Cervix or Neck of the Gall-bladder is twisted and folded against itself, and afterwards contracts and sends out a Duct called *Cysticus*, which runs near the *Ductus Hepaticus*, and then joins it, to form the *Ductus Communis Choledochus*. Tab. XCIII. Fig. 1.

The *Ductus Cysticus* is smaller than the *Ductus Hepaticus*, and differs from it also in having a number of imperfect Partitions or *Plicæ*, running in a somewhat spiral direction, and forming it into Cells which retard the flow of a Bile. Tab. XCIV. Fig. 6.

The Gall bladder serves as a Receptacle for the Bile, when the Stomach and Intestines are empty and have no need of it, and retains it till wanted for the purpose of Digestion.—It is afterwards discharged from the Gall-bladder, when the Stomach is full, into the *Ductus Communis*, and from that to the Duodenum, chiefly by the pressure of the surrounding Viscera, and partly, as some Anatomists suppose, by a small degree of contractile power in the Gall-bladder itself.

The whole of the Bile contained in the Gall-bladder is found, by experiment, to pass from the Liver through the Hepatic Duct to the *Ductus Communis*, and from that by the Cystic Duct into the Gall-bladder.

The Bile returning from the Gall-bladder is observed, from the thinner parts being absorbed, to be thicker, more acrid and bitter, and of a deeper colour, than that which flows from the Liver.

The *Ductus Communis Choledochus*, is about the size of a Goose-quill, and is considerably larger than either of the Ducts which open into it.

It descends at the posterior and left side of the Duodenum, and passes for some way obliquely between the Muscular and Inner Coats of the Gut,—the Obliquity answering the purpose of a Valve.

It terminates in the left, posterior, and nearly in the under part of the second turn of the intestine, by a projecting Orifice, which is rounded above, and pointed below. Tab. XCIII. Fig. 2. X.

The Structure of the *Ductus Choledochus*, and of the Biliary Ducts in general, is of the same nature, being entirely Membranous. The Inner Surface of the Ducts also agrees in being perforated by numberless Pores, which are the Mouths of Mucous Follicles, similar to those upon the inside of the Gall-bladder.

The Bile serves to mix the different parts of the Food properly.

properly together, for the formation of the Chyle,—to correct too great a disposition to acidity,—and to excite the Peristaltic motion of the Intestines.

SPLEEN.

THE *Spleen* is a soft and very Vascular Substance, and of a purple colour.

It is somewhat depressed, is of a long oval form, and of a considerable size, but varying in this respect in different Subjects. Tab. XCIV. Fig. 1. Tab. CXCIX. O.

It is situated in the Left Hypochondriac Region, between the large extremity of the Stomach and corresponding False Ribs;—its under end lying behind the Colon, and over the top of the Left Kidney. Tab. XCII. Fig. 1. Q.

The Situation of the Spleen varies a little, according to the state of Respiration, and to the fulness or emptiness of the Stomach;—rising or falling as the Lungs are less or more dilated, and becoming more oblique in its situation,—with its inferior extremity turned more forwards,—in proportion as the Stomach becomes more distended.

Its *External Surface* is convex and uniform, like that of the Ribs, &c. to which it is opposed.

Its *Internal Surface*, of that next the Spine, is irregularly concave; and is divided into an Anterior and Posterior Plane, by a longitudinal Groove or Fissure, where the Vessels and Nerves enter.

The Anterior Plane is more concave than the Posterior, corresponding to the contiguous convexity of the Stomach.

The Spleen has frequently deep *Fissures* upon its edges;—sometimes it has small *Appendages* attached to it, and not unfrequently there is one or more *Small Spleens* connected with it.

At the inner side, it is fixed to the Omentum, and, by means of that and Blood-vessels, to the Stomach and Pancreas.—Behind, it is connected to the Diaphragm; and below, to the Left Kidney and Colon, by Reflections of the Peritoneum, and by Cellular Substance.

It is covered by a *double Membrane*, one Layer of which is a production of the Peritoneum, the other proper to the Spleen itself, but so closely connected to the common Coat, that they appear to be one and the same Membrane.

The substance of the Spleen is remarkably soft, and it is by much the most tender of the Abdominal Viscera.

It consists of a Congeries of Blood-vessels, Lymphatics, and Nerves, joined together and supported by a large quantity of Cellular Substance. Tab. XCIV. Fig. 2.

The extreme Branches of the Blood-vessels put on the appearance of *Penicilli*, which have been mistaken for Glands.

These Vessels are so tender, that when an Injection is forcibly thrown into either Artery or Vein, particularly the latter, it bursts into the common Cellular Substance, and gives the appearance of Follicles or Cells.

The *Blood-vessels* of the Spleen are among the largest of the Body, in proportion to the size of the Viscus on which they are dispersed.

The *Artery* is a principal Branch of the *Cœliac*.—It runs in a Serpentine direction, and, after sending Branches to the Pancreas, &c. and the *Arteriæ Breves* to the left end of the Stomach, it goes into the Substance of the Spleen, where it is subdivided into Branches, which are crowded together, and run in every direction, forming at length Plexus and Penicilli, which terminate in the Branches of the corresponding Vein.

The *Vein*, like that in most other Viscera, is larger than the Artery: It receives the Blood immediately from the Terminations of the Artery, without the intervention of Cells.

The Splenic Vein receives the *Venæ Breves* of the Stomach, the Pancreatic Veins, &c. and forms one of the principal Branches of the *Vena Portæ*.

The *Lymphatics* from the superficial parts of the Spleen join the deep-seated Absorbents at the Fissure where the Blood-vessels enter, and afterwards pass through several Conglobate Glands lying over the Splenic Artery.

They intermix with Lymphatics belonging to several other Viscera, and terminate in the Thoracic Duct.

The *Nerves* of the Spleen, which are small, but considerable in number, are Branches of the Great Sympathetic and Eighth Pair, and form an irregular Plexus which surrounds the Vessels.

No Excretory Duct has been found to proceed from the Spleen, in consequence of which very various opinions have been entertained with respect to the use of this Organ.

Many of the Ancients were of opinion,—that besides the Bile of the Liver, there was an *Atra Bilis*, or *Black Bile*, and that the Spleen was the Receptacle of it.

Others have thought a particular *Menstruum* was secreted in it, and conveyed to the Stomach for the purpose of Digestion.

Others again,—that the Blood of the Spleen promotes the sluggish circulation of the Blood of the *Vena Portæ*.

The late MR HEWSON, who has written particularly on the Spleen, was of opinion it concurred with the Thymus and Lymphatic Glands, in forming the Red Globules of the Blood, and that these Globules were rendered complete in the Spleen.

It has been also supposed,—that as the Stomach becomes full, the Spleen is compressed by it, in consequence of which a greater quantity of Blood is sent to the Pancreas, for the Secretion of the Pancreatic Juice.

But the present most prevalent Opinion is,—that the Blood undergoes some change in it, which renders it useful in the secretion of the Bile; and the Opinion is supported from the great quantity of Blood with which this

this Organ is known to be supplied, and from its Vein, not only in Man, but in other Animals, passing to the Vena Portæ.

PANCREAS.

THE *Pancreas* is a long flat Gland of the Conglomerate kind, and of the same nature with the Salivary Glands, of which it may be reckoned the largest.

It is situated in the Epigastric Region, and is placed transversely in the back part of the Abdomen, between the Stomach and Spine. Tab. XCIV. Fig. 7. A, A.

It has a large or Right Extremity, and a small or Left one, an Anterior and Posterior Surface, and an Upper and Under edge.

The Right Extremity is attached to the left side of the second Turn of the Duodenum, or to that part where the Intestine is about to go across the Spine.

From the under part of the Right Extremity, the Pancreas sends down an Elongation or Process, which adheres closely to the Duodenum. Tab. XCIV. Fig. 7. B.

This Process was discovered by WINSLOW, and termed by him *Pancreas Minus*.—It is also called *Head of the Pancreas*.

The Body of the Pancreas passes before the upper edge of the transverse portion of the Duodenum, and over the Aorta, Vena Cava, and part of the Splenic Vessels, to all of which it is attached.

The Small Extremity, which is rounded, is fixed to the Spleen, through the medium of the large Omentum. Tab. XCIII. Fig. 2. Tab. CXCIX. N.

The Pancreas is covered anteriorly by the two Layers of the root of the Meso-colon;—posteriorly it is only covered with Cellular Substance, which connects it to the Vertebrae.

It is composed of Acini, which form small Glands or Lobes; and these are connected loosely by Cellular Substance, in such a manner as to give an appearance of uniformity and smoothness to the External Surface.

The *Arteries* of the Pancreas are derived, partly from the Hepatic, but chiefly from the Splenic, by several small Branches, which pass at various places into its Substance, in a transverse direction.

The *Veins* correspond in name and course with the Arteries, and assist in forming the Vena Portæ.

The *Lymphatics* run to the Splenic Plexus, and terminate in the Thoracic Duct.

The *Nerves* of the Pancreas are small. Like those of the other Viscera of the Abdomen, they are derived from the Great Sympathetic and Eighth Pair.

From the different Acini of the Pancreas, small Ducts arise, which join into larger ones, running transversely in the Substance of the Pancreas, and forming a common Duct, called *Ductus Pancreaticus*. Tab. XCIV. Fig. 7.

The *Pancreatic Duct*, termed also *Ductus WIRTSUNGI*, after the Discoverer of it in the Human Body, is remarkably thin, of a white colour, and Semi-transparent.

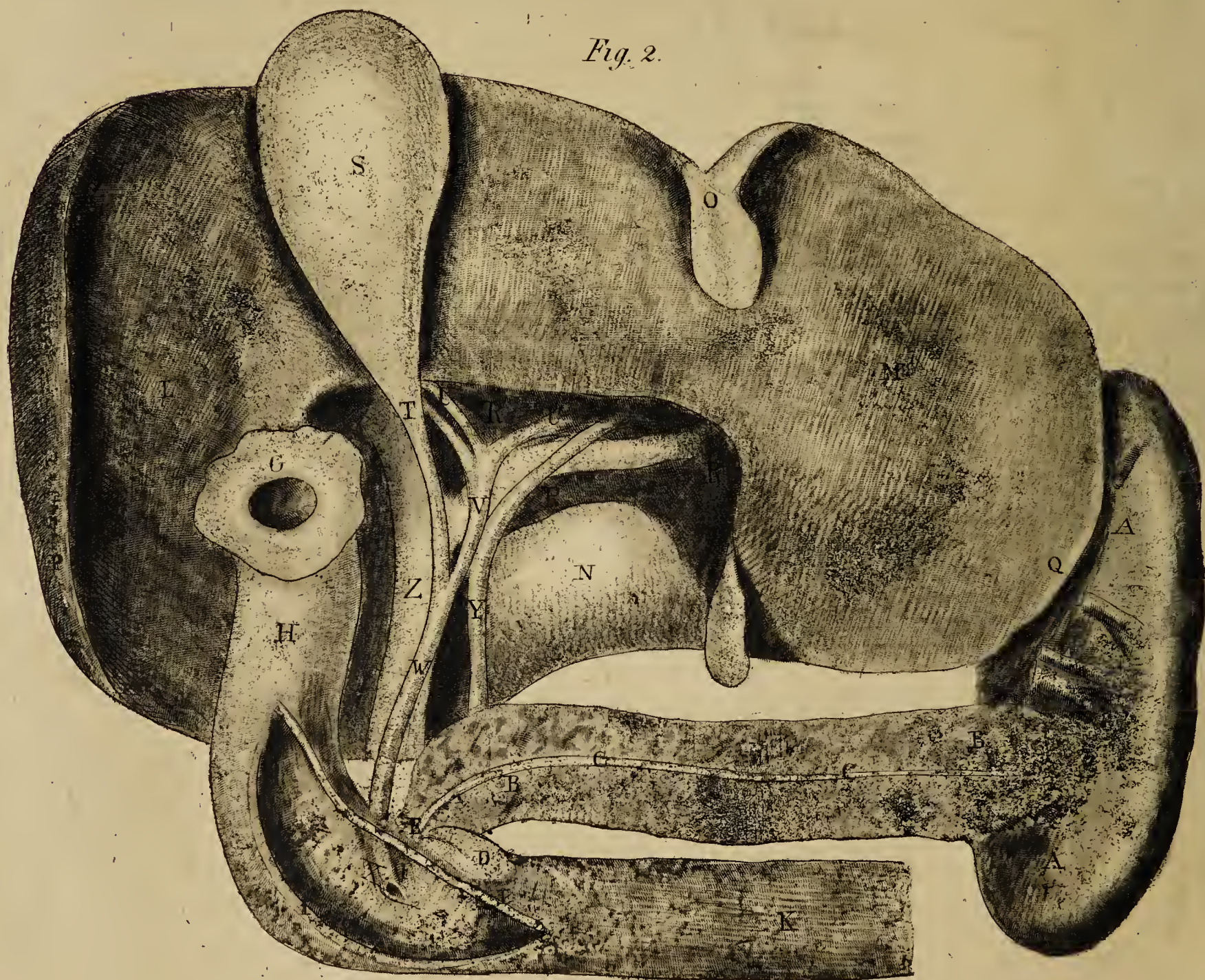
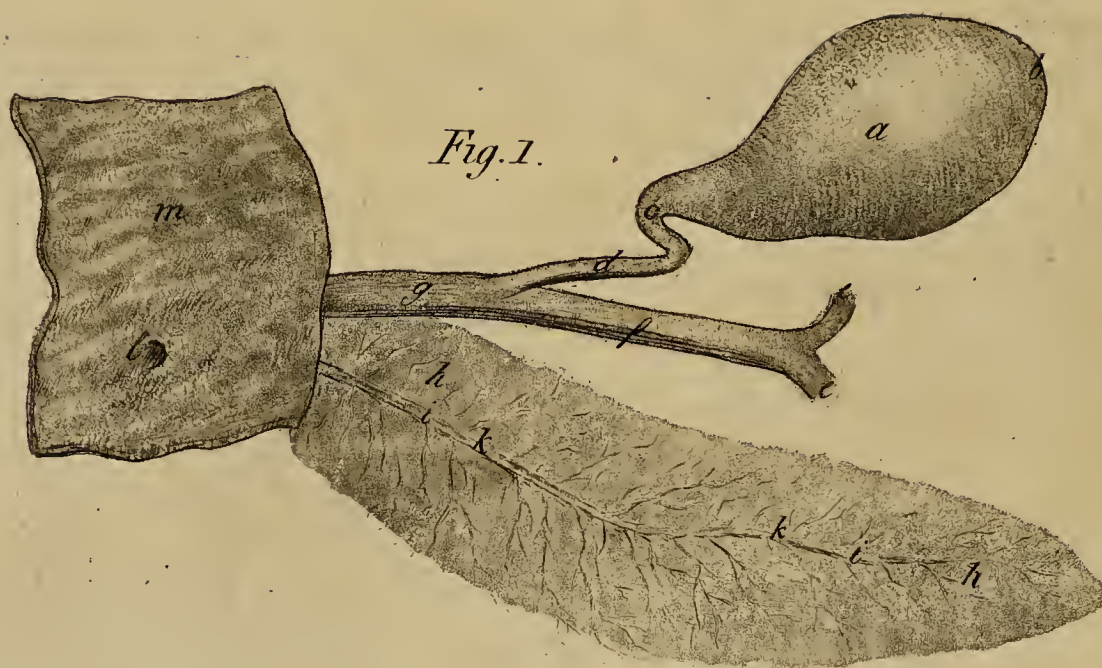
It begins at the Left Extremity of the Pancreas, runs in the Substance of the Gland, a little below its middle height, becoming gradually larger in consequence of receiving the different Branches which compose it,—and is at last about the size of a Raven's Quill. Tab. XCIV. Fig. 8. F, F.

At the Right Extremity of the Pancreas, it receives the Principal Duct of the Pancreas Minus, and terminates obliquely in the Duodenum along with the *Ductus Communis Choledochus*.—In some rare cases, however, it terminates at a little distance from the Biliary Duct; and sometimes also, the Duct of the Pancreas Minus ends separately in the Duodenum.

The Pancreas secretes a *Liquid*, resembling Saliva in quality and appearance, and discharges it by its Excretory Duct into the Duodenum. Tab. XCIII. Fig. 2. F.

The *Pancreatic Juice* incorporates the Bile with the Alimentary Mass, and may be said also to answer the same purpose to the Contents of the Intestines, which the Gastric Juice does to those of the Stomach; or, it finishes that Digestive Process in the Intestines which was begun in the Stomach.

TAB. 93.



T A B L E X C I I I .

The LIVER, SPLEEN, PANCREAS, and DUODENUM, with the Infertion of the BILIARY and PANCREATIC DUCTS.

FIG. 1.

A View of the GALL-BLADDER, and of the BILIARY and PANCREATIC DUCTS.

- a*, The gall-bladder ;
b, Its fundus ;
c, Its cervix ;
d, The cystic duct.
e, e, The right and left branches of the hepatic duct.
f, The hepatic duct.
g, The ductus communis choledochus.
h, h, The branches of the pancreatic duct.
i, i, Their termination in the pancreatic duct.
k, k, The trunk of the pancreatic duct.
l, The termination of the ductus communis choledochus, and pancreatic duct, in the duodenum.
m, The inner surface of part of the duodenum.

FIG. 2.

Represents the Under Surface of the LIVER, and the Anterior Surface of the SPLEEN, PANCREAS, and DUODENUM.

- A, A*, The anterior and inner part of the spleen, with its blood-vessels slightly represented.
B, B, The pancreas fixed by one end to the spleen, and by the other to the duodenum.
C, C, The pancreatic duct.
D, The pancreas minus.
E, The duct of the pancreas minus terminating in that of the pancreas majus.

- F*, The pancreatic duct, terminating in the duodenum.
G, The pylorus, with a small portion of the stomach.
H, The upper part of the duodenum, which is covered by the liver when *in situ*.
I, I, The curvature of the duodenum, slit open, to shew the rugæ, and the common orifice of the biliary and pancreatic ducts.
L, The under surface of the great lobe of the liver.
M, That of the small lobe.
N, The lobe of SPIGELIUS.
O, Part of the broad and round ligaments.
P, Part of the upper or convex surface of the liver :—
 The letter is placed upon the part to which the right lateral ligament was fixed.
Q, The part to which the left lateral ligament was fixed.
R, R, R, The sinus portarum by which the great blood-vessels enter the liver.
S, The gall-bladder.
T, The cystic duct.
U, U, The right and left branches of the hepatic duct.
V, The hepatic duct.
W, The ductus communis choledochus.
X, The ductus communis choledochus terminating in the duodenum, after having run for some way obliquely between its coats.
Y, The hepatic artery dividing into two principal branches.
Z, The vena portarum, also dividing into two principal branches.

T A B L E X C I V .

The Situation and Structure of the ASSISTANT-CHYLOPOIETIC VISCERA, with different VIEWS of the
VESICA URINARIA, and ORGANS of GENERATION.

FIG. 1.

A View of the SPLEEN, with its BLOOD-VESSELS injected.

- A, A, The internal concave part of the spleen next the stomach and pancreas.
B, B, The arteries.
C, C, The veins, which, like the arteries, form various contortions before they enter the spleen.

FIG. 2.

A Portion of the SPLEEN, with its VESSELS, some of which are unfolded.

- A, The extremities of some of the blood-vessels completely unfolded, resembling wool or cotton.
B, The extremities of others, partly unfolded.
C, A portion of the surface of the spleen, not unfolded.
D, The splenic artery.
E, The splenic vein.

FIG. 3.

The Common Cellular Texture of the Spleen, which has been mistaken for Cells peculiar to that Organ.

FIG. 4.

A View of the Concave or Under SURFACE of the LIVER.

- A, The left,
B, The right lobe of the liver.
C, The left lateral ligament.
D, D, The surface by which the liver adhered to the diaphragm.
E, The right lateral ligament.
F, G, The vena cava inferior.
H, A portion of the liver which furrounds the vena cava.
I, The sinus where the ductus venosus of the foetus runs.
K, A sinus where blood and biliary vessels penetrate, which belong chiefly to the left lobe of the liver.
L, M, Eminences between which,
N, The vena portæ enters.
H, I, L, The lobulus SPIGELII.
O, The hepatic duct.
P, The ductus communis choledochus.
Q, The cystic duct.
R, The gall-bladder, projecting beyond the edge of the liver.

S, The isthmus, under which a portion of the vena portæ joins the umbilical vein.

T, The sinus where the round ligament enters.

U, The broad ligament, in the edge of which the round one is inclosed.

FIG. 5.

A Section of the GALL-BLADDER and BILIARY DUCTS.

- A, The inner surface of the gall-bladder, to shew its reticulated appearance.
B, A portion of the hepatic duct.
C, The common duct.
D, The cystic duct.—In the cystic duct, the cells, and in the gall-bladder and biliary ducts in general, the orifices of the mucous ducts are represented, though not very distinctly.

FIG. 6.

A View of the TORTUOUS COURSE and CELLS of the BILIARY CYSTIC DUCT, with Part of the GALL-BLADDER.

- A, The neck of the gall-bladder.
B, B, The cystic duct, cut open to shew its cellular appearance.

FIG. 7.

A View of the PANCREAS, and of the Insertion of the PANCREATIC and BILIARY DUCTS in the DUODENUM.

- A, A, &c. The pancreas.
B, The pancreas minus of WINSLOW.
C, C, C, The pancreatic duct, running through the whole length of, and receiving many branches from the substance of the pancreas.
D, The pancreatic duct joining the common biliary duct, and ending in the duodenum, part of which is slit open.
E, E, The ductus communis choledochus.
F, The cystic duct.
G, The hepatic duct.
H, Part of the pancreas, cut from the ductus communis, which it covers.
I, The right extremity of the stomach.
K, The pylorus.
L, The duodenum.
M, The duodenum passing behind the mesentery.

N, The

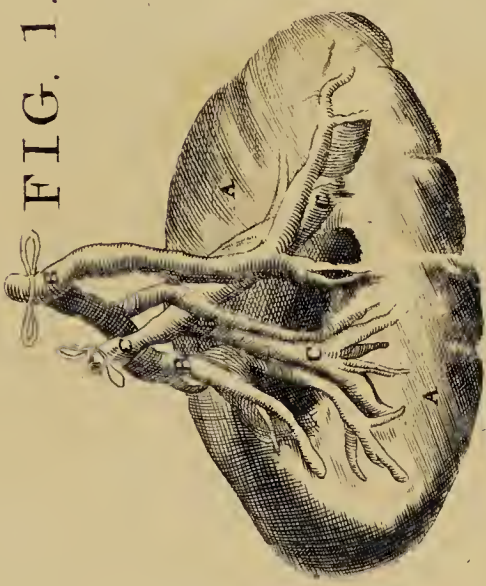


FIG. 1.

FIG. 2.



FIG. 6.



FIG. 8.



FIG. 9.

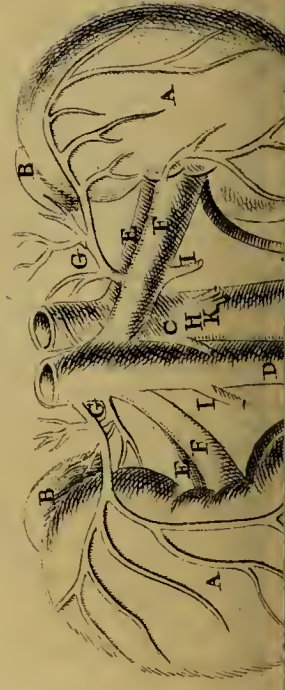


FIG. 3.

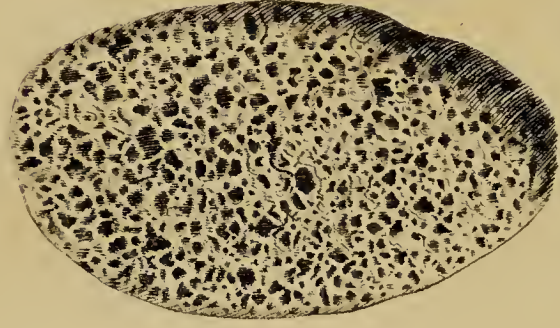


FIG. 7.



FIG. 11.

FIG. 10.

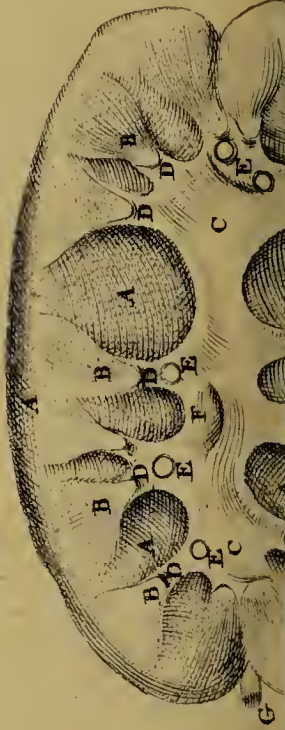


FIG. 4.

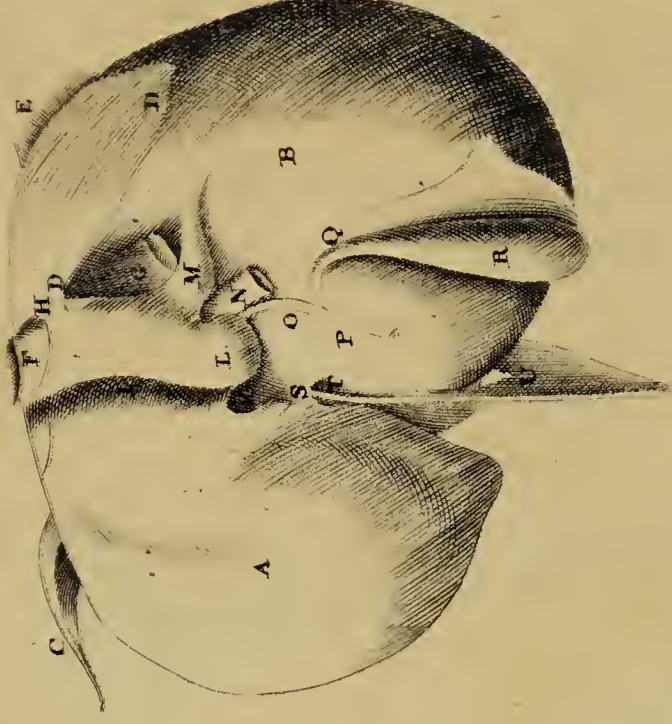


FIG. 12.

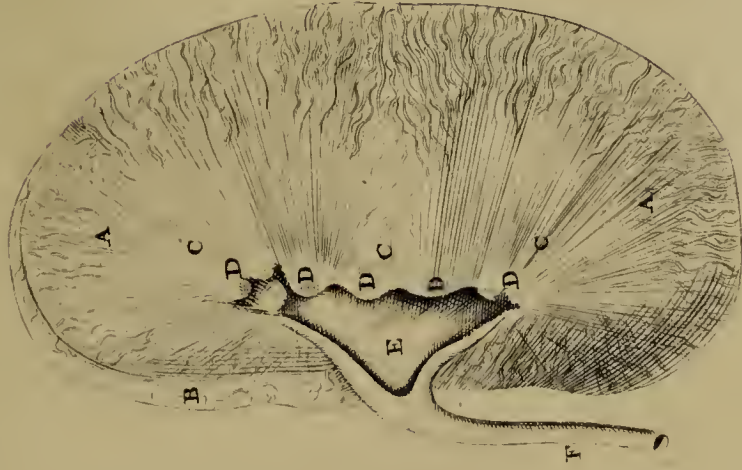


FIG. 14.



FIG. 13.

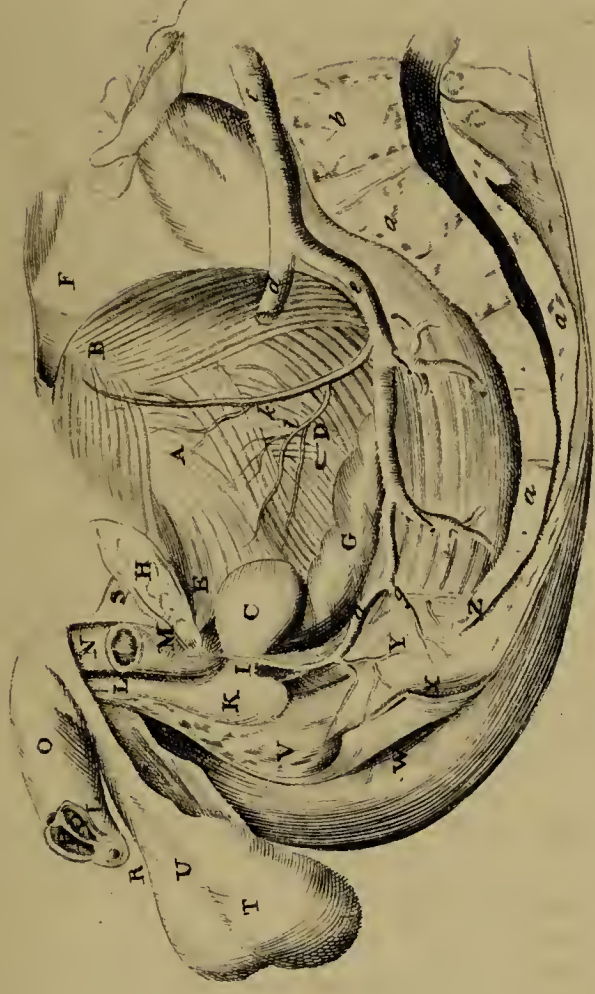


FIG. 15.



FIG. 16.

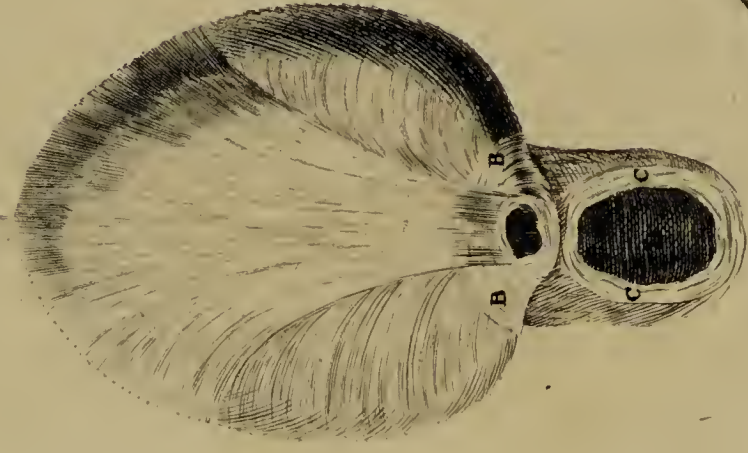
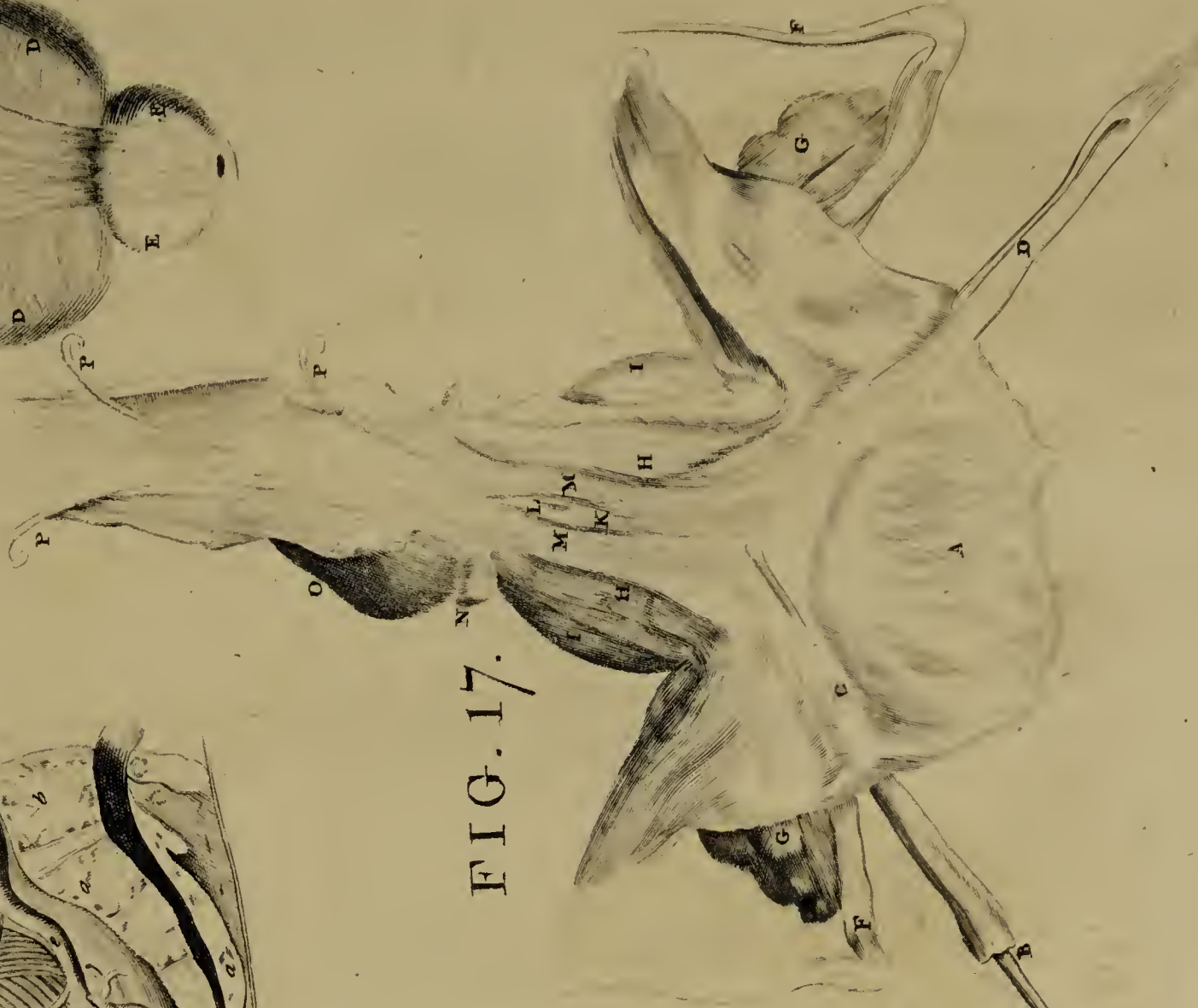


FIG. 17.



- N, The same intestine emerging upwards in the left hypochondrium, where it obtains the name of Jejunum.
 O, O, The mesentery.
 P, The vena meseraica.
 Q, The arteria meseraica.

FIG. 8.

A View of the Gall-bladder, Biliary and Pancreatic Ducts, with their Termination in the Duodenum.

FIG. 9.

Represents the KIDNEYS, with their BLOOD-VESSELS.

- A, A, The kidneys;—the right one somewhat larger and lower than the left.
 B, B, The renal glands, the right also represented larger than the left.
 C, The aorta.
 D, The inferior cava.
 E, E, The renal arteries, the right longer, lower, and more oblique than the left.
 F, F, The renal veins of the right side, shorter, lower, and more oblique than the left.
 G, G, Veins belonging to the kidney and renal glands.
 H, The spermatic arteries.
 I, I, ——— veins.
 K, The inferior mesenteric artery, represented a great deal too small.
 L, L, The ureters.

FIG. 10.

Shews the KIDNEYS and its PELVIS, divided through the middle from the Outer Edge to the URETER.

- A, A, &c. The cut surface of the cortical substance.
 B, B, &c. A section of the uriniferous substance, with radiated fibres ending in papillæ.
 C, C, A section of the pelvis of the kidney.
 D, D, &c. A section of the branches of the pelvis, called Infundibula.
 E, E, E, Some of the papillæ entire.
 F, The beginning of the ureter;
 G, Its continuation.

FIG. 11.

The Distribution of the Large BLOOD and URINIFEROUS VESSELS in the Substance of the KIDNEY.

- a, The renal, or emulgent artery, dividing into branches in the substance of the kidney.
 b, The corresponding vein.
 c, c, &c. The beginning of the infundibula, uniting into trunks, which form,
 d, The pelvis.
 e, The ureter continued from the pelvis.

FIG. 12.

A Section of the KIDNEY, to shew the Course of its Minute VESSELS.

- A, A, The minute branches of the renal artery, running

in a serpentine course, and many of them degenerating into uriniferous tubes.

- B, A portion of the external surface of the kidney.
 C, C, &c. The uriniferous ducts.
 D, D, &c. The papillæ.
 E, A section of the pelvis.
 F, The ureter.

FIG. 13.

The Contents of the MALE PELVIS, viewed on the Left Side.

- A, The vesica urinaria, the outer coverings of which are removed, to shew the different orders of its fleshy fibres.
 B, The fundus vesicæ.
 C, The prostate gland surrounding the neck of the bladder.
 D, The entrance of the ureter into the bladder.
 E, The tendinous ligaments of the bladder.
 F, The peritoneal coat reflected.
 G, One of the vesiculæ feminales.
 H, A section of the os pubis near its symphysis.
 I, The membranous part of the urethra.
 K, The bulb of the urethra.
 L, The urethra.
 M, The corpus cavernosum penis of the right side.
 N, A section of the left corpus cavernosum penis.
 O, A portion of the penis entire.
 P, Q, The corpora cavernosa penis, between which the septum is seen.
 R, The corpus cavernosum urethræ, surrounding the urethra.
 S, The suspensory ligament of the penis.
 T, The scrotum.
 U, The raphè, which extends from the anus along the middle of the scrotum.
 V, A section of the integuments.
 W, The anus.
 X, The sphincter ani.
 Y, The levator ani.
 Z, The os coccygis.
 a, a, a, The os sacrum.
 b, The last lumbar vertebra.
 c, The trunk of the common iliac artery.
 d, The beginning of the external iliac artery.
 e, The internal iliac artery.
 f, f, Branches which go through the great notch of the os ilium to the muscles.
 g, The external hæmorrhoidal branches.
 h, The arteria pudenda communis.
 i, A branch from this artery to the bulb of the urethra.
 k, The umbilical artery.
 l, Branches of this artery, to the vesica urinaria, vesiculæ feminales, and prostate gland.

FIG. 14.

A View of the Anterior Part, of the MALE BLADDER of U. IN. inflated; the PERITONEAL COAT and CELLULAR SUBSTANCE being removed.

- A, The urachus.

B, The

B, The muscular coat of the bladder, called Detrusor Urinæ, running down upon the prostate gland.

C, C, The ureters.

D, D, The under and lateral parts of the bladder, thinner and more dilated than the upper part.

E, E, The prostate gland.

FIG. 15.

A Posterior View of the same BLADDER of URINE.

A, B, C, D, As in Fig. 14.

E, E, The vesiculæ feminales, and,

F, F, The vasa deferentia, turned down to shew the posterior part of the detrusor urinæ.

G, The tough ligamentous substance between the vasa deferentia.

FIG. 16.

An Anterior View of the FEMALE BLADDER of URINE, divested of FAT and MEMBRANES, to shew its Situation upon the VAGINA.

A, The orifice of the bladder, close to,

B, B, The circular muscular fibres, or sphincter, from which part of the detrusor arises.

C, C, The circular fibres, or sphincter of the vagina.

D, The inside of the vagina, upon which the rugæ appear.

FIG. 17.

The Under Part of the BLADDER, and beginning of the URETHRA, slit open, and viewed Anteriorly.

A, The bladder.

B, A probe in the termination of the left ureter.

C, The ureter running obliquely between the coats of the bladder.

D, The termination of the right ureter slit open.

F, F, The vasa deferentia.

G, G, The vesiculæ feminales.

H, H, The neck of the bladder, surrounded by,

I, I, The prostate gland.

K, A projection in the beginning of the urethra, forming the caput Gallinaginis.

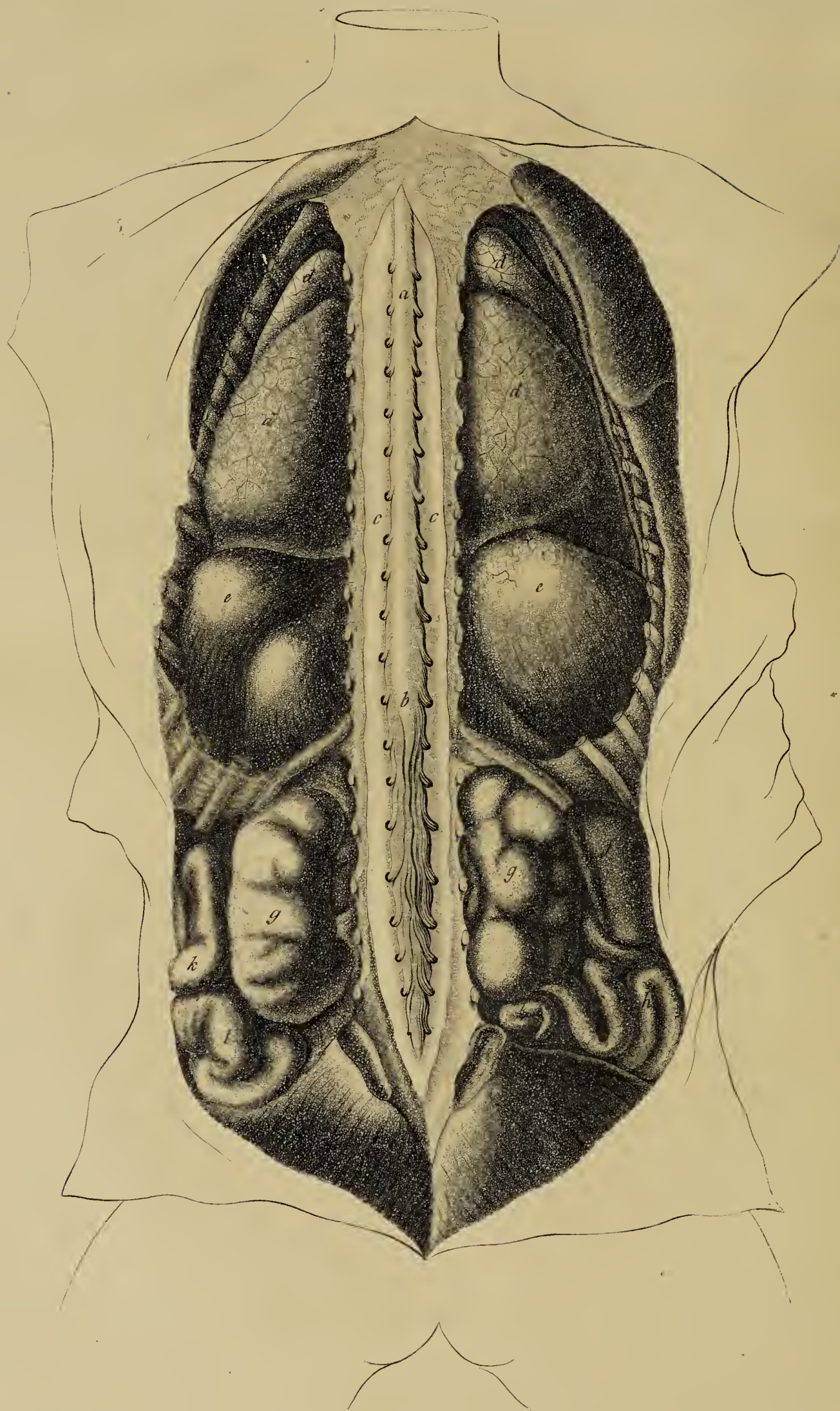
L, The termination of the feminal ducts.

M, M, The part where the ducts of the prostate gland terminate.

N, One of COWPER's glands.

O, The bulb of the urethra.

P, P, P, Probes put into some of the ducts of the urethra.



T A B L E X C V.

Represents the CONTENTS of the THORAX and ABDOMEN, seen from behind,—in a CHILD.

The Common Integuments, Muscles, Bones, and any other Parts which might obstruct the View, are dissected away. The Section is continued from the upper part of the Thorax to the lower part of the Spine. The Os Sacrum, and back parts of the Vertebrae, and of the Ribs, excepting the Twelfth Pair, are removed, to exhibit the Spinal Marrow with its Coverings. A small Portion of the Cristae of the Ossa Ilii is cut off, to shew the deep-seated Intestines.

- a*, The spinal marrow, with the origins of the spinal nerves.
b, The spinal marrow increasing in size towards the Cauda EQUINA, and opposite to the twelfth pair of ribs, its conical extremity sending off the ligamentum piaë matris.

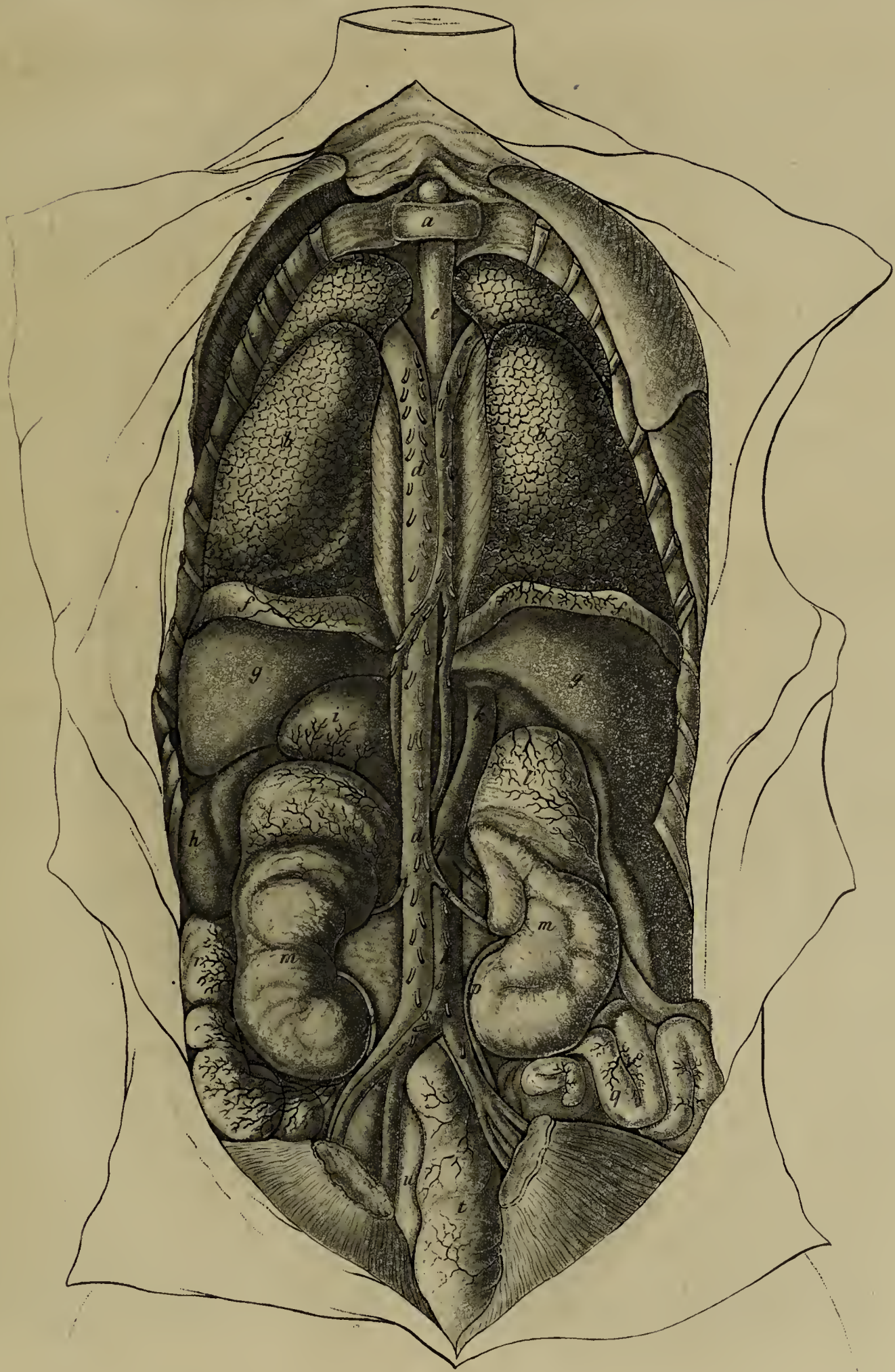
- c, c*, The dura mater slit open, and spread out upon the transverse processes of the vertebrae.
d, d, &c. The lobes of the lungs. They are conical above, and elevated behind; their under part is seen opposite the sixth rib. The lobules also are distinctly seen in this figure.
e, e, The diaphragm, with its arched posterior surface; the elevations and depressions corresponding with the subjacent viscera.
f, The apex hepatis projecting under the diaphragm, and over the intestines.
g, g, The kidneys lobated in the child.
h, The intestinum ilium advancing towards the cæcum.
i, The appendix vermiformis.
k, The left portion of the colon;
l, Its sigmoid flexure.

T A B L E XCVI.

In this TABLE, besides the Parts cut off in the former one, the DORSAL and LUMBAR VERTEBRÆ, with the Os SACRUM, and Part of the CRISTÆ of the OSSA ILII, are removed, that certain VISCERA, deeper seated than those represented in the preceding Figure, may appear.

-
- | | |
|--|---|
| <i>a</i> , The sixth cervical vertebra. | <i>l, l</i> , The glandulæ supra-renales, the left surrounded by the stomach, spleen, and kidney, and therefore a little compressed, the right more conical, lying under the hollow surface of the liver. |
| <i>b, b</i> , The lungs, the lobules of which are less accurately represented than in the former Table. | <i>m, m</i> , The kidneys lobated and surrounded with a proper membrane. |
| <i>c</i> , The esophagus. | <i>n, n</i> , The renal arteries. |
| <i>d, d</i> , The aorta, in which are seen the origins of the intercostal, lumbar, and sacral arteries, and its passage through the diaphragm. | <i>o</i> , The renal veins. |
| <i>e</i> , The vena azygos arising in the abdomen, and perforating the diaphragm near the aorta. | <i>p, p</i> , The ureters emerging from the pelvis of the kidneys. |
| <i>f, f</i> , The diaphragm, the posterior part of which is cut off, to shew the viscera which it concealed. | <i>q</i> , The termination of the small intestines, the cæcum, and appendix vermiformis. |
| <i>g, g</i> , The liver proportionally large in the child. | <i>r</i> , The left, or descending portion of the colon. |
| <i>h</i> , The spleen. | <i>s</i> , The aorta sending off, and the vena cava receiving the iliac branches. |
| <i>i</i> , A portion of the stomach. | <i>t</i> , The intestinum rectum. |
| <i>k, k</i> , The vena cava inferior, with the termination of the lumbar veins. It is seen receding from the aorta upon approaching the liver. | <i>u</i> , Part of the uterine vagina. |

TAB. 96.



Aquatinted by A. Fyfe.

OF THE ORGANS OF URINE AND GENERATION IN THE MALE.

KIDNEYS.

THE *Kidneys* are two Glandular Bodies, of a pale-red Colour, situated in the upper and back part of the Abdomen, in the Lumbar Region. Tab. LXXXVI. 7.

They are placed one on each side of the Spine, extending from the Eleventh Pair of Ribs to near the *Ossa Iliæ*, and rest upon the Diaphragm, large *Psoæ*, *Quadrati Lumborum*, and *Transversales Abdominis*. Tab. CLIX.

The Right Kidney is situated at the under and back part of the large Lobe of the Liver, behind the Colon, and is commonly a very little lower than the left.

The Left Kidney is placed at the under and back part of the Spleen, and behind the left portions of the Stomach, Pancreas, and Colon.

The Kidney is about five or six fingers-breadth in length, but considerably less from the outer to the inner side, and less still from before backwards; or, it is compared in shape to a *French* or *Kidney Bean*.

It is rounded anteriorly, flattened posteriorly, convex and uniform at its outer margin, and has a deep Depression or Sinus towards the *Vertebræ*, surrounded with unequal edges, where the Renal Vessels and Nerves enter. Tab. CI. Fig. 1.

It is a little broader behind than before, and a little broader and more curved above than below; from which circumstances, but more particularly from the disposition of the Vessels to be afterwards mentioned, it is easy to distinguish the Right from the Left Kidney when taken out of the Body.

The Right Kidney is connected to the Liver and Duodenum, the Left to the Spleen, and both to the Muscles on which they are placed, and to the Renal Glands and Colon, by Cellular Substance and by the Peritoneum.

They are also connected to the Aorta and Vena Cava by their Blood-vessels, and to the Bladder of Urine by the Ureters.—They accompany the motions of the Liver and Spleen, in the different states of Respiration.

Each Kidney is surrounded by loose Cellular Substance, which commonly contains a considerable quantity of Fat, from which it is termed *Tunica Adiposa*.

The *Tunica Adiposa* covers not only the Kidney, but large Vessels, and defends them from the pressure of the surrounding Viscera.

Under the *Tunica Adiposa*, there is a *Membrane* composed of the original proper Coat and Cellular Substance incorporated, which adheres closely to the Kidney, and is reflected over the edges of the Sinus, to be joined to the Pelvis and large Vessels.

The Substance of the Kidney is commonly smooth and uniform, though sometimes it is irregular, in consequence of the Lobes which originally form it not being completely incorporated.—It consists of an outer part called *Cortical*, and an inner termed *Medullary*.

The *Cortical Substance*, termed also *Secerning*, surrounds the Kidney, and forms about a third of its breadth.—It likewise sends in Partitions, which separate the Medullary parts from each other. Tab. CI. Fig. 2. *a, a*.

The *Medullary*, termed also *Uriniferous Substance*, is of a redder colour than the former, and is divided into a number of distinct Columns, each of which terminates in a Projection called *Papilla*, or *Processus Mammillaris*. Tab. CI. Fig. 2. *b, b*.

The *Papillæ* are merely the continuation of the Uriniferous part; though frequently considered as a third division of the Substance of the Kidney. Tab. CI. Fig. 2. *c, c*.

Each Kidney has one, and sometimes more *Arteries*, which run transversely from the Aorta, and a *Vein* still larger than the Artery, which terminates in the Cava.—They enter at the Sinus of the Kidney, and are included in Cellular Substance, which accompanies them throughout their course. Tab. CI. Fig. 1. *A, B*.

The Right Renal Artery is longer than the Left, in consequence of the Vena Cava, behind which it passes, being placed upon the right side of the Aorta.

The Artery, as it approaches the Kidney, is divided into Branches, which are afterwards minutely distributed through the Cortical Substance, forming Arches and Anastomoses; but these are found to be much less frequent than are commonly described.

The small Branches, after turning and winding in various directions, pass partly towards the Surface of the Kidney, where they form irregular *Stars*, some of which supply the proper Membrane.

Others turn inwards in a waving direction, and form *Corpuscles*, disposed somewhat after the manner of *Clusters of small Berries*, which can only be seen distinctly by the assistance of Glasses, after a minute Injection.

The *Corpuscles* were considered by Dr NICHOLS as the Globular Terminations of Blood-vessels, and termed by him *Globuli Arteriarum Termini*; but these Globuli were afterwards observed by Mr HEWSON to consist of small Vessels intimately intermixed.

The *Veins* returning from the extremities of the Arteries unite in the Cortical Substance of the Kidney.

The Branches of the Renal Vein are much larger than those of the Artery, but correspond with them in their course.—They form a large Trunk on each side, which lies

lies anterior to the corresponding Artery, and runs transversely to the Cava; the left, which is the longer of the two, passing across the fore-part of the Aorta.

The *Lymphatics* of the Kidney run from without inwards, and terminate in the Lumbar Glands, and afterwards in the Thoracic Duct.—The Superficial Lymphatics are so small, as seldom to be seen, excepting in the diseased state of the Kidney.

The *Nerves* are from the Semilunar Ganglion formed by the Great Sympathetic and Eighth Pair. They compose a Plexus which surrounds the Blood-vessels, and accompanies them in the Kidney.

From the minute extremities of the Renal Artery, in the Corpuscles seated in the Cortical Substance, the *Uriniferous Tubes* arise. They are mixed with some extremely small Blood-vessels, and constitute the Medullary Substance of the Kidney.

By degrees they unite into larger Tubes, which run in a radiated manner, the direction being from the outer edge or circumference, towards the inner part or Cavity of the Kidney. Tab. XCIV. Fig. 10. B, B.

The Radiated Tubes, becoming still larger in their passage, terminate in the *Papillæ*, which are of a compressed conical form, and at a little distance from each other. Tab. XCIV. Fig. 10. B.

The *Papillæ* are twelve or more in each Kidney, the number varying according to that of the Original Lobes of which the Kidney is composed, and likewise from some of the *Papillæ* being incorporated with each other.

Upon the Points of the *Papillæ* are the Terminations of the Uriniferous Tubes,—large enough to be distinguished by the naked Eye,—through which the Urine distils from the Substance of the Kidney.

Round the root of each *Papilla*, a Membranous Tube arises, termed *Infundibulum* or *Calix*, which receives the Urine from the *Papillæ*. Tab. XCIV. Fig. 10. D, D.

The *Infundibula* are commonly the same in number with the *Papillæ*; the number, however, varying in different Subjects, two or more of the *Papillæ* sometimes opening into the same *Infundibulum*.

The *Infundibula* join into two or three larger Trunks, which afterwards form a Dilatation of considerable size, of the shape of an inverted Cone, and termed *Pelvis* of the Kidney. Tab. CI. Fig. 2. f, f.

The *Pelvis* is placed partly within, but the greater part of it without the Body of the Kidney, and contracts into a long Tube, about the size of a writing pen, called *Ureter*. Tab. CI. Fig. 2. D.

The *Ureters* are commonly one to each Kidney, though in some rare instances they are double on one or on both sides.

The Artery of the Kidney is placed uppermost,—the Vein in the middle and fore part,—and the *Pelvis* and beginning of the Ureter at the under and back part of the Blood-vessels; which disposition of the Vessels serve as a distinguishing mark between the Right and Left Kidney, when separated from the Body. Tab. CI. Fig. 1.

The *Ureters* descend obliquely inwards behind the Peritoneum, and go over the Psoæ and Iliac Vessels, opposite to the anterior and lateral parts of the Os Sacrum. Tab. LXXXVI. Fig. 4. M, M. Tab. CLXXIV. E.

They pass afterwards into the Pelvis, and terminate in the under, outer, and back part of the Bladder. Tab. CLXXIV. F. Tab. CCIV. Fig. 2. G.

In their descent, they do not run in a straight, but in a waving direction, somewhat similar to the Italic *f*;—neither are they cylindrical, as they form slight dilatactions and contractions in their course, two of which contractions are more observable in their passage over the Psoæ Muscles, and at their insertion into the Bladder.

The *Ureters* are covered anteriorly by the Peritoneum, and composed of an *External Membranous Coat*, a *middle Muscular* one, formed chiefly of circular Fibres, and an *Internal Coat*, sometimes called *Villous*.

The Inner Coat is very Vascular, and is perforated by the Mouths of small Ducts, which line it with a Mucus, to defend it from the Urine.

The Vessels and Nerves of the *Ureters* are from those of the contiguous parts.

The Kidneys secrete the Urine from the Blood, and convey it by means of the *Ureters* to the Bladder.

RENAL GLANDS.

THE *Renal Glands*, termed also *Capsulæ Atrabilarie*, *Capsulæ Renales*, *Renes Succenturiati*, and *Glandulæ Supra-renales*, are two small, flat, Glandular-like Bodies, of a dark-yellow colour, lying in the upper and back part of the Abdomen.

They are situated at the upper, inner, and fore part of the Kidneys, over the large Psoæ Muscles and Diaphragm, and higher than the Renal Vessels. Tab. XCIV. Fig. 9. B, B. Tab. XCVI.

They are of an irregular figure, and are about a couple of fingers breadth in length, but much larger proportionally in the Fœtus than in the Adult.

The Right one is connected to the Liver, the Left to the Spleen and Pancreas, and both to the small Muscle of the Diaphragm, and to the Psoæ Muscles and Kidneys, by Cellular Substance. They are likewise retained by numerous Vessels and Nerves which are spread over them.

They are surrounded by Cellular Substance, which is part of the Tunica Adiposa of the Kidneys, and have a thin proper Coat, which adheres firmly to them.

They are frequently observed to be hollow, and to contain a dark-coloured Bilious-like matter, which is considered by many Anatomists as the Internal very Vascular and tender parts melted down by Putrefaction.

Their *Arteries* come from those of the adjacent parts, particularly from the Renal, and also from the Aorta, and Diaphragmatic Arteries.

Of

Of the principal *Veins*, the Right goes to the Vena Cava, and the Left to the Renal Vein.

The *Lymphatics* go chiefly to those of the Kidneys.

The *Nerves* come principally from the Renal Plexus.

They have no Excretory Ducts.

The Renal Glands have been supposed to furnish Lymph for the Dilution of the Blood returning in the Renal Veins, after the secretion of the Urine;

Or, to restore to the Blood of the Vena Cava, the irritable parts lost in the secretion of the Urine and Bile;

Or, to convey something useful to the Thoracic Duct;

Or, in the Fœtus, to divert the Blood from the Kidneys, and thereby lessen the quantity of Urine.

But their use is still undiscovered: though it is supposed from their vicinity to the Kidneys, not only in Man, but in many other Animals, that they are subservient to these Organs, particularly in the Fœtus.

VESICA URINARIA.

The *Vesica Urinaria*, or *Bladder of Urine*, is a large Sac situated in the Pelvis, in the bottom of the Hypogastric Region. Tab. LXXXVI. Fig. 4. Y.

It is placed in the fore-part of the Pelvis, behind the Offa Pubis, and before the upper, and above the under portion of the Intestinum Rectum. Tab. XCVII.

When empty, it is contracted into a small size, which occupies the under and fore part of the Pelvis, Tab. CCIV. Fig. 2. F; but, when fully distended, it rises above the Brim of that Cavity, and sometimes ascends to within a little distance of the Umbilicus. Tab. XCVII.

When moderately dilated, it is of a roundish, or irregular oblong form, but a little flattened before, more convex behind, and broader at its anterior and posterior, than towards its lateral parts,—a little more capacious, also, below than above, especially at its posterior part.

It is distinguished into *Fundus*, *Body*, and *Cervix*, the first of which is placed upwards and a little forwards;—and the last at the under and fore part.

It is connected below to the Rectum, and at the sides to the Pelvis, by the reflected Peritoneum and Cellular Substance; the former of which, when the Bladder is empty, has the appearance of lateral Ligaments.

It is attached, at the fore-part of its Body, by Cellular Substance, to the Offa Pubis, without the intervention of the Peritoneum. Tab. CIV.

It is also fixed to the Umbilicus by three Ligaments situated between the Peritoneum and Abdominal Muscles.—They are formed of the Urachus running upwards from the Fundus, and of the shrivelled Umbilical Arteries passing obliquely from the sides of the Bladder. Tab. LXXXVI. Fig. 1.

The firmest connection is by means of a Ligamentous

Expansion, which runs from each side of the Neck of the Bladder and Prostate Gland, to be fixed to the inside of the Arch of the Offa Pubis.—It is connected, also, at this place, to the Penis, by the Urethra.

It is composed of different *Coats* joined together by Cellular Substance; the first of which is only a partial one continued from the Peritoneum. Tab. LXXXVI. Fig. 4. y, y.

The *Peritoneal*, or *Common Coat*, recedes from the Abdominal Muscles at the top of the Pubes, and passes over the superior, and down upon the posterior and lateral parts of the Bladder, to near the termination of the Ureters, where it is about a finger's length from the Anus, and is there reflected upon the Rectum and back part of the Pelvis.

When the Bladder is much distended, it carries the Peritoneum with it, and leaves a space between that Membrane and the Pubes, of such length, that an Incision has frequently been made here, and large Calculi extracted from the Bladder, without penetrating into the Abdomen, or wounding the Peritoneum.

The *second Coat* is termed *Muscular*.—It is composed of distinct Flethy Fibres, interwoven with each other, and forming Fasciculi. Tab. XCIV. Fig. 13.—15.

The External Fibres run chiefly in a longitudinal direction, and are connected at the under and fore part of the Bladder, with the Offa Pubis.

More internally, are Fibres which run in all directions, and are intermixed with each other in the form of Network.

The Muscular Fibres are contracted about the Neck of the Bladder, and form what has been termed *Sphincter Vesicæ*;—these, however, are merely the continuation of the other Fibres.

The Muscular Coat, by its contraction, occasions the complete evacuation of the Bladder.—The Fibres about the Neck of the Bladder, by acting separately from the rest of the Muscular Coat, prevent the involuntary discharge of the Urine.

The Cellular Substance, under the Muscular Fibres, is frequently termed *Nervous Coat*.

The *Inner Coat*, though often called *Villous*, is smooth like the inside of the Peritoneum, and, though thin, is so dense as to prevent the exudation of the Urine. Tab. XCIV. Fig. 17. A.

This Coat is rendered somewhat unequal by the projecting of the Fasciculi of the Muscular Fibres; and when the Bladder is empty, it forms large Wrinkles or Rugæ.

The inside of the Bladder is very irritable, in consequence of which a desire to expel the Urine is occasionally excited. It is lined, however, by a Mucus, discharged from its Arteries, which prevents it from being constantly irritated by that Fluid.

The under part of the Bladder is perforated by three *Openings*; of which one is placed anteriorly, and two posteriorly.

The

The Anterior Opening is the beginning of the Passage called *Urethra*, and is surrounded by the Neck of the Bladder. Tab. XCIV. Fig. 17. H, H.

It comes off almost at a right angle from the lower part of the Bladder, without any tapering of that Viscus.

The other two Openings are formed by the termination of the Ureters, which run obliquely forwards and inwards, between the Muscular and Inner Coat of the Bladder. Tab. XCIV. Fig. 17. C, D.

They terminate in the Bladder at a little distance from each other, and at the same distance behind the beginning of the Urethra, each by a somewhat oval Opening, which is more contracted than the Ureter is immediately above it. Tab. XCIV. Fig. 17. C, D.

The *Arteries* of the Bladder come from various sources, but chiefly from the Umbilicalis and Pudenda Communis.

The *Veins* return to the Internal Iliacs:—They form a Plexus of considerable size upon each side of the Bladder.

The *Lymphatics* accompany the principal Veins on the Bladder, and, at the under part and sides, pass into the Iliac Glands.

The *Nerves* are Branches of the Great Sympathetic and Sacral Nerves.

The Bladder receives the Urine from the Ureters by drops, and sometimes by small Thread-like streams or squirts, till, by its accumulated quantity and acrimony, it forces that Viscus to contract and expel it.

The Urine is expelled, partly by the contraction of the Bladder itself, and partly by the action of the Abdominal Muscles and Diaphragm pressing the Intestines against the Bladder.

The frequency of the evacuation depends upon the size and sensibility of the Bladder, upon the quantity of Urine secreted, and the degree of acrimony it possesses.

TESTES.

The *Testes*, formerly termed *Didymi* or *Gemini*, are two Glandular Bodies situated in the Cavity of the Scrotum.

The *Scrotum*, Tab. LXXXVI. which furnishes an External Covering to the Testes, is a continuation of the common Integuments, has the same Structure with the Skin in general; but is more plentifully supplied with Sebaceous Follicles, has no Fat in its Cellular Substance, and is occasionally relaxed and corrugated in a greater degree than the Skin in the other parts of the Body.

Upon the Surface of the Scrotum, there is a superficial, longitudinal, projecting *Line*, which divides it into two equal parts, and has the name of *Raphe*.

The inner Surface of the Scrotum is lined with Cel-

lular Substance, which is firmer and more Vascular than in other places.

The Cellular Substance of the Scrotum, in consequence of its Redness, Fibrous appearance, and supposed power of Contraction, has, by many Anatomists, been considered as a Muscle, and called *Dartos*.—This opinion, however, has been rejected.

The Cellular Substance of the Scrotum involves each Testicle singly, and forms a Septum between the two, which prevents Air or Water from passing readily from one side of the Scrotum to the other.

The *Vessels* and *Nerves* of the Scrotum are chiefly from those of the neighbouring parts.

The Blood-vessels are Branches of the Pudendal and Femoral.

The *Lymphatics* go mostly to the Inguinal,—but some of them accompany those of the Testes to the Lumbar Glands.

The anterior part of the Scrotum derives its *Nerves* from the Lumbar, and the posterior from the Pudendal and Sciatic Nerves.

The Scrotum assists in supporting and protecting the Testes.

Under the Scrotum are two *Membranes* or *Coats*, proper to each of the Testes, the one termed *Vaginalis*, the other *Albuginea*.

The *Tunica Vaginalis*, Tab. XCVIII. Fig. 1. C, named from its forming a Sheath, is of the same nature with the Peritoneum, being originally a Process of that Membrane, which, in the Fœtus, descends with the Testicle from the Abdomen.

It forms a shut Sac, which has no communication with any other part.

It incloses the Testicle, as the Pericardium does the Heart, being only in contact with it, excepting behind, where it is *continuous* with the *Albuginea*.

It is considerably larger than the Testis which it incloses, reaching as far above and below it as to allow it a certain degree of motion.

It is connected by its external Surface to the Cremaster, and partly by that Muscle to the inner Surface of the Scrotum.

It assists the Cremaster in supporting the Testis, and by being constantly moistened within by a Fluid exhaled from its Surface, and from that of the *Tunica Albuginea*, it allows the Testicle to move easily.

The *Tunica Albuginea*, so called from its white colour, is, like the former Coat, a continuation of the Peritoneum, and invests the Body of the Testicle closely. Tab. XCIX. Fig. 1. A.

It is a thick, strong, dense, and inelastic Membrane, of a glistening appearance.

It is remarkably smooth on the outside, but internally it is rough and unequal, adhering every where firmly to the Body of the Testis.

It covers both the Testis and Substance called *Epididymis*,

mis, connects them to each other, gives strength to them, and conducts their Vessels in the same manner the Mesentery does those of the Intestines.

The Body of the Testis is of a yellowish colour, and has a Pulpy appearance,—is of an oval form, a little flattened at its outer and inner sides; and frequently one Testicle is a little larger than the other.

The Testes are placed obliquely, with one end upwards and forwards, and the other end backwards and downwards. Tab. XCVIII. Fig.

The Epididymis is situated at the outer and back part of the Testis, and is inclosed in the same Covering. Tab. XCVIII. Fig. 2. G, H, I.

The Epididymis begins at the upper part of the Testicle, immediately above the entry of the Blood-vessels; and this part of it being large and of a round form, is termed *Globus Major*, or *Head* of the Epididymis. Tab. XCVIII. Fig. 2. G.

In its descent, it becomes somewhat smaller and flatter, and is attached behind to the Body of the Testicle, where the Blood-vessels enter anteriorly; but it is loose, the Tunica Albuginea dipping in this place, and forming a Cavity or Pouch.

The under part of it becomes more firmly attached to the Body of the Testicle, and forms the *Gauda*, or *Globus Minor*. It is then turned backwards upon itself, after which it sends out the Excretory Duct of the Testicle. Tab. XCVIII. Fig. 2. I.

The Body of the Testis has numerous Arteries, Veins, Absorbents, and Nerves; but is principally composed of a collection of minute, tender, elastic Filaments, intricately convoluted, termed *Tubuli Seminiferi*, or *Vasa Seminalia*.

The *Tubuli Seminiferi* are disposed in Fasciculi or Bundles, between Partitions, which are formed of Blood-vessels and Cellular Substance. Tab. XCVIII. Fig. 8. A, A.

These Septulæ begin at the root or *Nucleus*, situated at the back part of the Testicle, sometimes termed *Corpus Highmorianum*, and extend in a radiated manner to the Tunica Albuginea. Tab. XCVIII. Fig. 8. B, B.

The Testis is fixed behind by its Vessels, which are collected into a Cord termed *Spermatic*, but is loose and free before, to prevent it from being pinched.

The *Spermatic Cord*, Tab. XCVIII. Fig. 2. A, B, properly so called, extends from the Ring of the Obliquus Externus to the Body of the Testis, and is composed of the Trunks of the different Vessels belonging to it, and of a quantity of Cellular Substance.—The Cord is covered by the Cremaster, and within it, by the same Process of the Peritoneum, which forms the Tunica Vaginalis Testis. Here, however, the Process is so incorporated with the common Cellular Substance of the Cord, as to appear to form part of it.

The under part of the Vagina of the Cord is separated by a Partition formed by the upper end of the Vaginal Coat of the Testicle, and by condensed Cellular Sub-

stance, so that no Liquor can pass easily from the Cord to the Testicle, or *vice versa*.

The Arteries of the Testes, termed *Arteriæ Spermaticæ*, and *Arteriæ Preparantes*, arise, one on each side, from the fore-part of the Aorta, a little below the Renal Arteries.

The *Spermatic Artery* crosses over the Psoas Muscle and Ureter, and descends, behind the Peritoncum, to the under part of the Abdomen.

At the lower part of the Abdomen, it perforates the Ring of the Obliquus externus, and passes in the Spermatic Cord to the Testicle.

In its descent, it gives Branches to the adjacent parts, and is so interlaced with those of the corresponding Vein, as to have been supposed by the Ancients to have large lateral communications with them.

After passing the Ring, it divides into Branches which go to the Testis at its posterior edge. They are partly dispersed upon the Epididymis, but the larger Branches run in a serpentine direction into the Substance of the Testis, where they are minutely distributed upon the Surface of the Seminal Tubes.

Besides the Spermatic Artery, there is a smaller one from the Hypogastric, which accompanies the Vas Deferens, and is dispersed along with the other Artery.

The Veins are much larger than the corresponding Arteries, and have several Valves in them, especially without the Abdomen.

They form a *Plexus*, which accompanies the Artery on each side, and is sometimes called *Corpus Pampyniforme*, from a supposed resemblance to the Shoots of the Vine, or *Corpus Pyramidale*, from giving a Pyramidal form to the Cord.

The Plexus ascends in the Abdomen, upon the Surface of the Psoas; and about the part where it recedes from the Artery, it forms a single Trunk, which, in the right side, terminates in the Vena Cava, nearly opposite to the Artery, and, in the left side, goes into the Renal Vein.

There is also a small inferior Spermatic Vein, which accompanies its Artery, and ends in the Hypogastric Vein.

The *Tubuli Seminiferi* in the Body of the Testicle consist of numberless extremely minute Ducts, which are of a Cylindrical form, have no division into Branches, and, when drawn out, are found to be several feet in length.

They are first collected into Bundles, between the Septulæ of the Testicle, and these again into others still smaller, each of the smaller being formed of a simple Tube, coiled up into a Conical form, with its Base forwards, and its Apex towards the posterior edge of the Testicle.

From the convoluted Seminal Tubes, an equal number of straight Vessels are sent out at the back part of the Testicle, under the name of *Vasa Recta*. Tab. XCVIII. Fig. 6. *b, b*.

At the upper and back part of the Testicle, the Vasa Recta communicate, and form an irregular Plexus or Net-work, called *Rete Vasculosum Testis*. Tab. XCVIII. Fig. 6. g, g.

The *Rete Testis* sends out from twelve to eighteen straight Tubes, termed *Vasa Efferentia*, which carry the Semen from the Testicle to the Epididymis. Tab. XCVIII. Fig. 6. f, f.

The *Vasa Efferentia* soon become convoluted, and form Conical Bundles, termed *Coni Vasculosi*.

The *Coni Vasculosi* are firmly connected by Cellular Substance, and are observed by Dr MONRO, in his *Treatise De Testibus*, to compose somewhat more than a third part of the Epididymis.

The Vascular Cones gradually unite unto a single Tube, which constitutes the rest of the Epididymis, and though only about the size of a Hog's Bristle, transmits the whole of the Semen.

The single Tube becomes larger in its course and less convoluted, and at last expanding its convolutions, it comes out greatly increased in size, and almost in a straight direction, under the name of *Vas Deferens*. Tab. XCVIII. Fig. 6. a.

Besides the Ducts already described, a *Vas Aberrans* is sometimes observed, which is one of the Vascular Cones, wandering off, and terminating in the Epididymis lower than usual.

At other times, the same kind of Vessel forms a *Processus Cæcus*, or blind Duct, with a dilated Extremity which does not communicate with any other part.

VESICULÆ SEMINALES AND PROSTATE GLAND.

THE *Vesiculæ Seminales* are two small Pyriform Receptacles, situated between the under and lateral parts of the Bladder and the Intestinum Rectum,—about *three fingers-breadth* in length, and the third part of that in breadth, and a little flattened. Tab. XCVII.—Tab. CCIV.

They are at a considerable distance from each other behind, but anteriorly they converge, and become contiguous, forming a sharp Angle. Tab. XCVIII. Fig. 9. D. D.

Each of them is composed of a convoluted Tube, with *irregular Processes*, and surrounded by a quantity of tough Cellular Substance, and by many Vessels and Nerves.

Internally, they have a *Villous appearance*, and are formed of irregular *Cells*, which correspond with the irregularities on their External Surface, and communicate freely with each other.—Their shape, size, and general appearance, however, vary in different Subjects, and not unfrequently in the same Person. Tab. XCVIII. Fig. 10. D, D.—Tab. XCIX. Fig. 7. S.

Between the *Vesiculæ Seminales*, the ends of the *Vasa Deferentia* now become larger and Cellular, pass forwards till they arrive at the Prostate Gland, where each

Vas Deferens joins the *Vesicula* of that side, and communicates so freely with it, that injected fluids readily pass from the one to the other. Tab. XCVIII. Fig. 10. B, B, C, C.

From each *Vesicula Seminalis* and *Vas Deferens* of the same side a *small Canal*, about a *Finger's-breadth* in length, passes out, which is firmly connected to its fellow, without communicating with it, and becomes gradually smaller, piercing obliquely the Prostate Gland, and terminating in the under and back part of the Neck of the Bladder. Tab. XCVIII. Fig. 10. E, E, F, F.

The *Orifices* of these Canals are separated from each other by a *Caruncula*, or round Projection of the Membrane of the Urethra, termed *Veru-montanum*, from its supposed resemblance to a Javelin of the Ancients;—or *Caput Gallinaginis*, from its being broad behind and rostriform before, and therefore compared to the Head and Beak of the *Woodcock*. Tab. XCIV. Fig. 17. K.

The *Vesiculæ Seminales* are commonly considered as Reservoirs of the Semen, receiving it from the *Vasa Deferentia*, and afterwards,—by a power inherent in themselves,—assisted by the action of the neighbouring Muscles, particularly of the *Levatores Ani*,—propelling it into the Urethra.

The Semen is prevented from passing into the Bladder; the Opening from it being shut while that Fluid is expelled.

Various Experiments have been made on the *Vesiculæ Seminales* by the late MR HUNTER,—from which he was of opinion,—that they are not Reservoirs of Semen, but Glands, secreting a particular Mucus;—that, with other parts, they are subservient to the purposes of Generation;—and that the Bulb of the Urethra is the Receptacle of the Semen, in which it is accumulated previous to its ejection.

The *Prostate Gland*, or *Corpus Glandulosum*,—lies immediately behind the under end of the Symphysis Pubis, and rests upon the Intestinum Rectum. Tab. XCVII.—Tab. CCIV. Fig. 2. K.

It surrounds and closely embraces the Neck of the Bladder, or beginning of the Urethra; but the greater part of it is placed posteriorly and laterally, having a Lobe projecting on each side.

It is about the size of a Walnut, and of the figure of a Spanish Chestnut,—or it resembles a Heart as commonly painted on Playing-cards, with the Base towards the Bladder, and the Point towards the Penis.

It has a Spongy Substance, but is one of the firmest Glands of the Body, and generally sends out *Ten* or *Twelve Ducts*, which open obliquely at the beginning of the Urethra, at the sides of the *Caput Gallinaginis*, and near the termination of the Seminal Ducts. Tab. XCIV. Fig. 17. M, M.

From the Ducts of the Prostate Gland, a thin white Liquor is discharged,—from the same causes, and at the same time with the Semen,—into the Urethra, and is supposed to be useful in the Process of Generation;—or, according

according to some Authors, this Fluid facilitates the passage of the Semen through the Urethra.

The Blood-vessels, Absorbents, and Nerves of the Vesciculæ Seminales and Prostate Gland, are in common with those of the parts which surround them.

PENIS.

The *Penis* consists of three Spongy Substances, two of which form the upper part and sides, or Body of the Penis, and are termed *Corpora Cavernosa Penis*, the third surrounds the Urethra, and has the name of *Corpus Spongiosum Urethrae*. Tab. XCVII.—Tab. CCIV.

The Penis is covered with a continuation of the common Integuments, which are thinner than elsewhere, and instead of Fat, there is, as in the Scrotum, a Reticular Substance only under the Skin.

At the anterior extremity of the Penis, the Integuments form a loose Fold, termed *Prepuce*, which is connected to the anterior and under part, or *Glans* of the Penis, by a triangular Fold, called *Franum Preputii*.

The *Corpora Cavernosa Penis* resemble two equal but irregular Cylinders, closely applied to the sides of each other, and each covered by a strong, elastic, Ligamentous Sheath; the Fibres of which run in a transverse, and partly in an oblique direction. Tab. XCVIII. Fig. 11.

They arise one on each side, by two blind Conical extremities, called their *Crura*, from the inner part of the Crura of the *Ossa Ischia* and *Ossa Pubis*, to both of which they are very firmly connected by Ligamentous Substance. Tab. CCIV. Fig. 3.

At the under part of the Symphysis Pubis, they are united to each other, and continue so till they reach the Glans, where they terminate in a rounded extremity. Tab. CCIV. Fig. 2. N.—Tab. XCVIII. Fig. 11.

At the upper part of the root of the Penis, the Ligamentous Sheath of the *Corpora Cavernosa* sends up a Process of a triangular form, to be connected to the Symphysis *Ossium Pubis*, under the name of *Ligamentum Suspensorium*, by which the Body of the Penis is supported, and prevented from pressing too much upon the Scrotum. Tab. XCVIII. Fig. 11. E.

The *Corpora Cavernosa* leave a Groove above, for the principal Vein of the Penis, and a Channel below, for the Cavernous Substance of the Urethra. Tab. XCVIII. Fig. 13.

The internal Substance of the *Corpora Cavernosa* consists of loose Reticular Plates, somewhat similar to the Cancelli in the ends of long Bones, and, like them, readily communicating with each other. Tab. XCVIII. Fig. 12. A, A.

Upon the Cells of the *Corpora Cavernosa* the Arteries are plentifully dispersed, and open freely into them, the

Blood of the Arteries tinging the Cells in the relaxed state of the Penis, and filling them completely when it is distended.

The *Corpora Cavernosa* are united to each other by a *Septum*, formed by a continuation of the Elastic Ligaments which cover these Bodies. Tab. XCVIII. Fig. 12. B, B.

The *Septum Penis* is composed of Cords, extending nearly in a parallel direction, from the Dorsum Penis to the *Corpus Spongiosum Urethrae*.

Between the different Cords, *Fissures* are left, through which the Blood, or an Injected Fluid, passes without obstruction from one of the *Corpora Cavernosa* to the other.

The *Corpus Spongiosum Urethrae* is situated under and between the *Corpora Cavernosa Penis*, but projects considerably beyond them. Tab. CCIV. Fig. 2. M, Q.

It begins a little behind the part where the *Corpora Cavernosa* are united, adheres to them by condensed Cellular Substance, and terminates at the anterior extremity of the Penis.

It has an external Covering similar to that of the *Corpora Cavernosa Penis*, but more delicate, and more of a Membranous appearance.

The posterior part of the *Corpus Spongiosum* is dilated into a *Longitudinal Prominence*, of a *Conical* form, situated within the Skin of the Peritoneum, and termed *Bulb* of the Urethra. It extends from the root of the Penis to near the Anus, projects most towards the under and back part, and is divided anteriorly by a *Septum*. Tab. CCIV. Fig. 2. M.

The *Corpus Spongiosum* is continued along the under part of the *Corpora Cavernosa*, and at the end of these expands into the Substance called *Glans Penis*, which covers and incloses the ends of the *Corpora Cavernosa*. Tab. XCVIII. Fig. 12. C.

The *Glans* is separated from the *Corpora Cavernosa* by a continuation of the Ligamentous Sheath which covers them, Tab. XCVIII. and is encircled at its posterior part by a prominent Margin, called *Corona Glandis*; behind which is a *Cervix*.

The Surface of the Glans is covered with a *Plexus* chiefly of Venous Vessels, and with *Nervous Papillae* which give it its Sensibility; and these are inclosed in a fine Membrane continued from the inside of the Prepuce.

About the Cervix and Corona of the Glans, are many *Follicles*, termed *Glandulae Odoriferae*, which discharge a Sebaceous Matter, to preserve the sensibility of the Glans, and allow the Prepuce to move backwards and forwards upon it with facility. Tab. XCVIII. Fig. 11.

The Internal Structure of the Bulb of the Urethra and Glans Penis, is of the same nature with that of the *Corpora Cavernosa*; and the Internal Structure of the rest of the *Corpus Spongiosum* differs from that of the *Corpora Cavernosa* only in this, that the Cells are smaller

er and of a more delicate texture, Tab. XCVIII. Fig. 11.—18. Some Anatomists consider the greater part of the Corpus Spongiosum as merely a Plexus of convoluted Veins.

The *Urethra* is a long Canal, the Diameter of which is nearly equal to that of a writing-pen. It begins at the under and fore part of the Bladder, runs through the Corpus Spongiosum, and terminates in the point of the Penis by a longitudinal Orifice. Tab. XCIV. Fig. 17.—Tab. XCVIII. Fig. 11. 13.

At its Origin, it descends a little, and then passes forwards, under the Symphysis of the Os Pubis, to which it is closely connected by Cellular Substance.—It then ascends at the under and fore part of the Os Pubis; varying in the remainder of its course, according to the different degrees of relaxation or distension of the Cells of the Penis. Tab. CCIV. Fig. 2.

There are commonly *three Dilatations* in the Urethra; one of which is at the Prostate Gland, the second in the Bulb of the Urethra, and the third about the beginning of the Glans.

In general, it has also the same number of *slight Contractions*; the first at its Origin from the Bladder, the second between the point of the Prostate Gland and Bulb of the Urethra, and the third at the point of the Glans.

Between the point of the Prostate Gland and part where the Urethra penetrates the Corpus Spongiosum,—including nearly the space of a Finger's-breadth,—the Urinary passage is entirely *Membranous*, and covered only with the common Cellular Substance. Tab. CCIV. Fig. 2. I.—Tab. XCVII. f.

At the upper side of the Bulb, the Urethra enters the Corpus Spongiosum, in which it is inclosed to its termination in the point of the Penis. Tab. CCIV. Fig. 2.

The inside of the Urethra is lined by a very *Vascular* and *sensible Membrane*, which is observed to possess a certain degree of Contractility, and is therefore presumed by several Anatomists to be endowed with Muscular Fibres.

Between the Corpus Spongiosum and Membrane which lines the Urethra, especially towards the Septum Penis, numerous *Lacunæ* of different sizes are situated; one or two of which in particular, next the Glands, are often considerably larger than the rest. Tab. XCVIII. Fig. 11.

They run in a longitudinal direction from behind forwards, and, perforating the Urethra by Orifices large enough to admit a Bristle, they discharge a bland Mucus for the defence of the Urethra.

Besides the Lacunæ, two small Bodies, each about the size of a Garden-pea, are frequently met with, and are termed, from their Discoverer, *COWPER'S Glands*.

They are situated at the sides of the Membranous part of the Urethra,—between its Bulb and the point of the Prostate Gland;—and covered by the Acceleratores Urinæ. Tab. XCIV. Fig. 17. N, N.—Tab. XCVII. c.

When present, they are observed to discharge from their Ducts into the Urethra, a Fluid which is supposed to serve the same purpose with that of the Lacunæ.

The *Arteries* of the Penis are chiefly from the Pudicæ Communes which are Branches of the Internal Iliacs, and partly from the Femoral Arteries.

Each of the Pudic Arteries having passed out of the Pelvis through the great Notch of the Os Ilium, runs between the Sacro-Sciatic Ligaments to the inner side of the Tuber Ischii, from which it passes along the Crus of that Bone and of the Os Pubis, to the root of the Penis.

In its course, it furnishes Branches to the adjacent parts, and afterwards gives off three principal Branches, which belong to the Penis:—One of these goes to the Bulb of the Urethra, to be dispersed in the Corpus Spongiosum;—the other two, which are larger than the former, go to the Body of the Penis, one of them penetrating its Crus, and running in the Centre of the Corpus Cavernosum, the other passing between the Symphysis Pubis and joining of the Crura Penis, and extending along the Dorsum as far as the Corona Glandis.

The Branches of the Femoral Artery to the Penis communicate with those of the former, and are chiefly dispersed upon the Integuments.

The Arteries of the Penis are divided into minute Ramifications, which communicate with each other, and with their fellows on the opposite side, and terminate partly in the corresponding Veins, and partly in the Cells of the Penis.

The *Veins* arise, some from the extremities of the Arteries, and others by large open Mouths from the Cells of the Penis.

The greater number of the Veins unite into a Trunk, called *Vena Magna Penis*, which runs in the superior Groove formed by the union of the Corpora Cavernosa, and is furnished with Valves, and with thick strong Coats.

The Vena Magna, at the under end of the Symphysis Pubis, separates into Right and Left Plexus, which pass to the corresponding Iliac Veins.

To an obstruction of the course of the Blood through the Veins, by the pressure of the Muscles at the root of the Penis, together with an increased influx through the Arteries, is owing that accumulation of Blood in the Corpora Cavernosa, which occasions a distension of the Penis.

The relaxation of the Penis happens from the causes which produced the distension being removed; the Elastic Ligamentous Membrane which covers the Penis again forcing the Blood from the Cells into the Veins.

Upon the Surface of the Penis, there are small superficial Veins, which communicate with those deeper seated, and commonly terminate by one or more Branches in the Veins at the top of the Thighs.

These Branches assist in carrying on the circulation, and

and return part of the Blood during the distension of the Penis.

Of the *Lymphatics* of the Penis, those from the Prepuce and Skin, in general, go to the right and left Inguinal Glands, while the Lymphatics from the Glans and Body of the Penis accompany the Arteries into the under part of the Pelvis.

The *Nerves* of the Penis are large in proportion to the size of that Organ. They come from that part of the

Spinal Nerves which gives origin to those termed *Sciatic*, and are distributed chiefly upon the Ligamentous Sheath which incloses the Corpora Cavernosa.

The most considerable of them are situated upon the Dorsum Penis, more laterally than the Arteries which lie between them and the Principal Vein.

For the Muscles of the Penis, see Part II.

The Penis serves to eject the Semen into the Vagina, and to convey the Urine from the Bladder.

TABLE

T A B L E XCVII.

A Side VIEW of the MALE PELVIS, after separating the Left Os INNOMINATUM.

- A, The cartilaginous surface of the right os pubis, forming part of the symphysis pubis.
 B, That of the os sacrum, forming part of the joint between this bone and the os ilium;
 C, A fibrous cellular substance, forming part of this joint.
 D, The situation of the point of the os coccygis, supposed to be seen through the rectum.
 E, The psoas muscle.
 F, G, A section of the muscles in the back part of the loins.
 H, A section of the pyriformis.
 I, ————— glutei.
 K, K, The levator ani turned back, a portion of it being removed to shew the situation of the anus.
 L, The right thigh.
 M, M, The integuments and fat.
 N, The intestinum rectum inflated, adhering to the anterior surface of the os sacrum.
 O, O, The peritoneum descending to the bottom of the pelvis.
 P, The dilated under end of the rectum.
 Q, Part of the anus.
 R, R, The bladder of urine in the distended state, rising a considerable way above the pubes.
 S, S, The upper and back part of the bladder, covered by the peritoneum, the fore-part being only covered by cellular substance.
 T, The ureter, with its contractions and dilatations.
 U, The termination of the left ureter in the under and lateral part of the bladder.
 V, The neck of the bladder, and beginning of the urethra.
 W, The spermatic blood-vessels.
 X, The cremaster muscle covering the spermatic cord.
 Y, The left testicle covered by the scrotum.
 Z, The left vas deferens.
 a, The dilated, cellular under end of the vas deferens.
 b, The left vesicula seminalis inflated.
 c, The beginning of the ductus communis feminiferis.
 d, The prostate gland surrounding the neck of the bladder.
 e, One of COWPER's glands.
 f, The membranous part of the urethra.
 g, The ligamentum suspensorium penis.
 h, The bulb of the urethra.
 i, The left crus penis, and,
 k, Its erector turned aside.
 l, A section of the corpora cavernosa penis, and of,
 m, The corpus spongiosum urethræ.
 n, The cut end of the vena magna penis.
 o, A catheter introduced through the urethra into the bladder.

TABLE

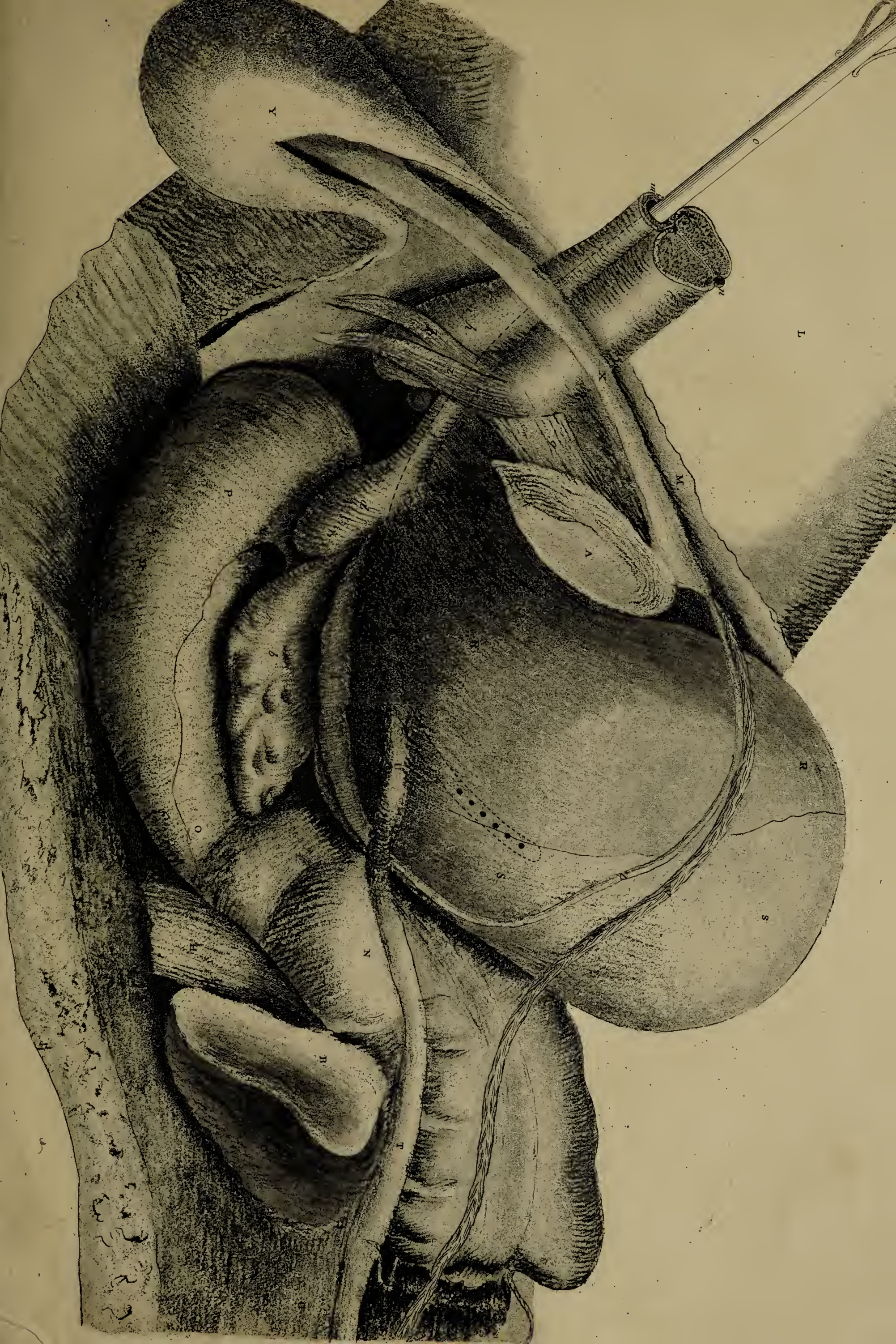


FIG. 1.

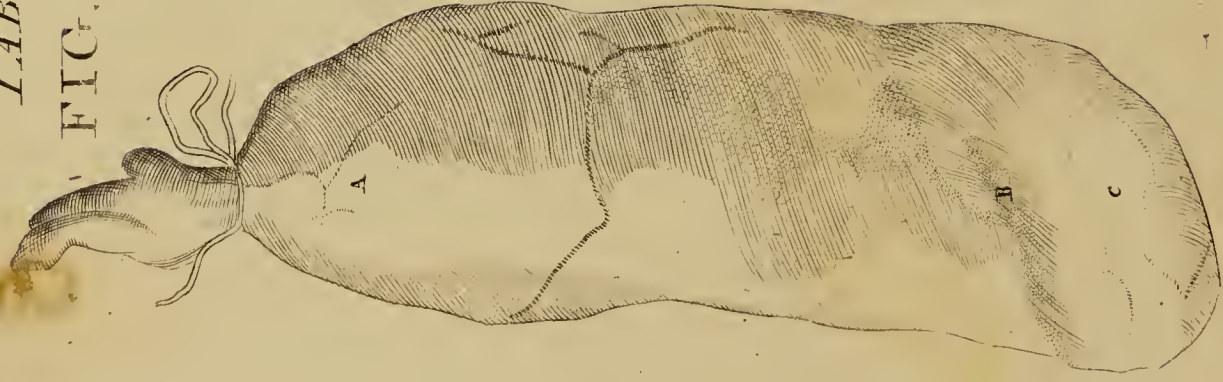


FIG. 6.

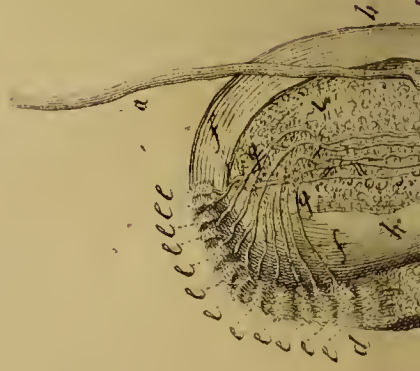


FIG. 7.

FIG. 2.

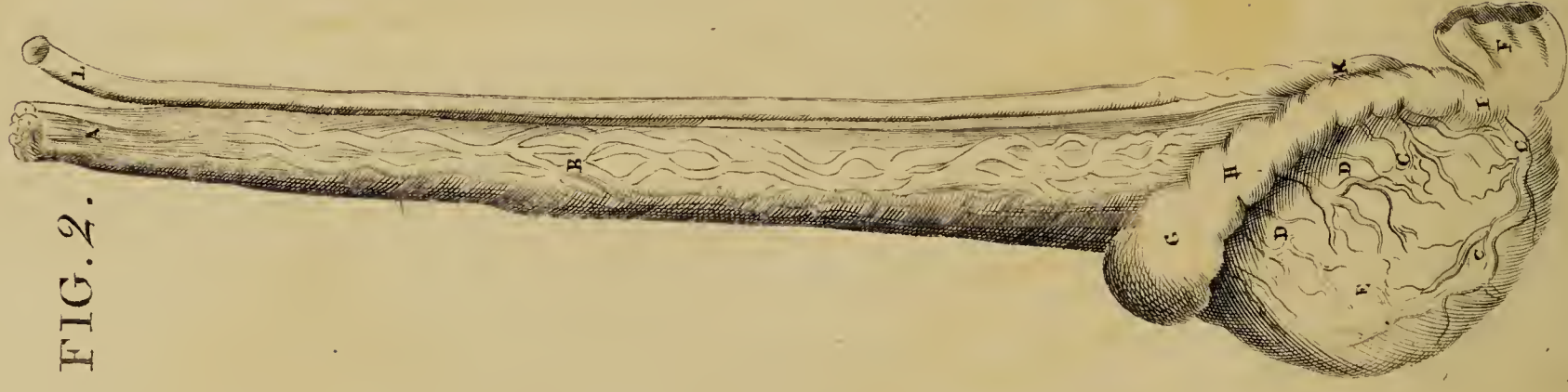


FIG. 3.

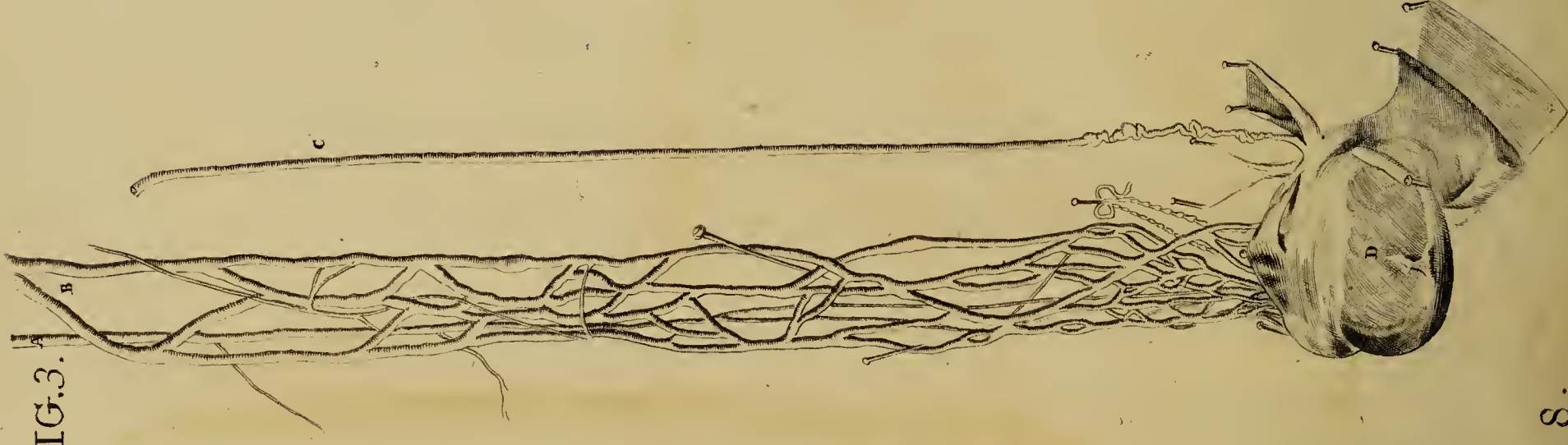


FIG. 8.

FIG. 4.



FIG. 5.

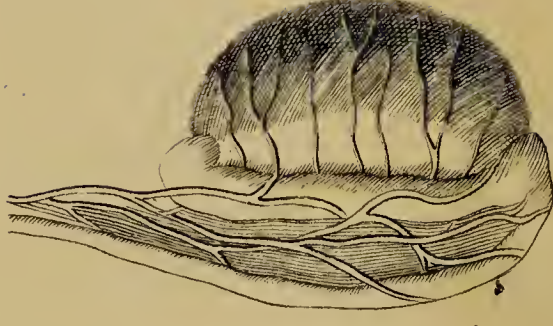


FIG. 9.

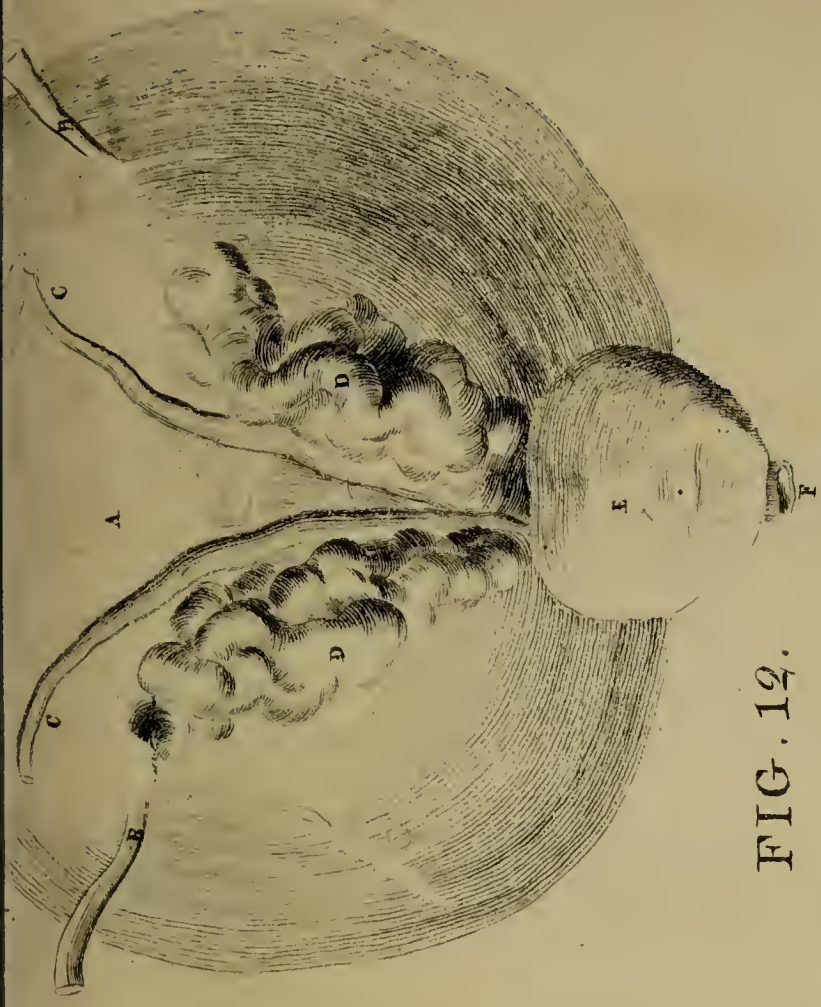


FIG. 12.

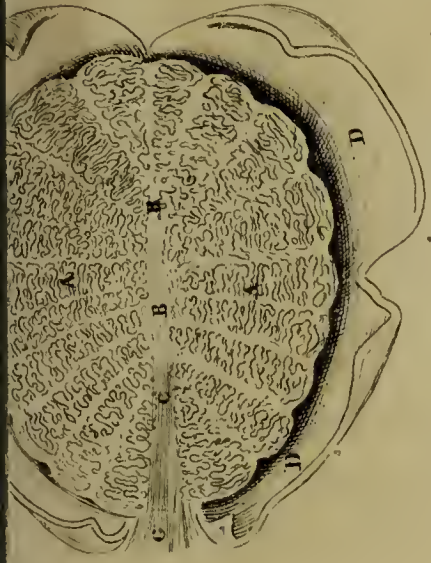


FIG. 11.

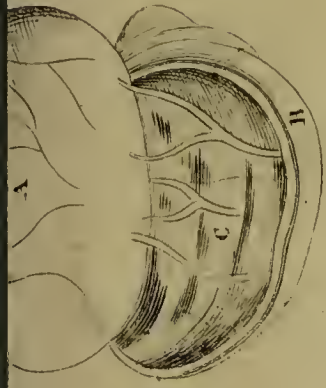


FIG. 10.



FIG. 13.



T A B L E XCVIII.

VIEWS of the MALE PARTS of GENERATION.

FIG. 1.

Gives a View of the VAGINAL PROCESS of the SPERMATIC CORD inflated, to shew that there is no immediate communication between this and the VAGINAL COAT of the TESTICLE.

- A, B, The vaginal process of the spermatic cord inflated.
 B, A partition formed by condensed cellular substance between the vaginal process and testicle.
 C, The testicle inclosed in its vaginal coat.

FIG. 2.

A View of the SPERMATIC CORD and TESTICLE of the Left Side.

- A, The vasa præparantia.
 B, The vessels of the testicle running in the spermatic cord, freed from their membranes.
 C, C, C, The arteries of the testicle.
 D, D, The corresponding veins.
 E, The tunica albuginea of the testicle.
 F, Part of the tunica vaginalis turned back.
 G, H, I, The epididymis;
 G, Its globus major;
 I, ———— minor.
 K, The end of the epididymis, or beginning of the vas deferens.
 L, A section of the vas deferens.

FIG. 3.

Represents the BLOOD-VESSELS and SEMINAL DUCTS of the TESTICLE.

- A, The spermatic artery.
 B, ———— vein.
 C, The vas deferens.
 D, The testicle, with its coats cut and pinned back.

FIG. 4.

The Right TESTICLE viewed from the Fore-part.

- a, The testicle.
 b, The vas deferens.
 c, The epididymis.
 d, d, d, Blood-vessels.
 VOL. II.

FIG. 5.

A View of the opposite Side of the Testicle represented in Fig. 4.

FIG. 6.

Shews the SPERMATIC DUCTS of the TESTICLE, filled with Quick-silver.

- a, The vas deferens;
 b, Its beginning, at the under part of the epididymis.
 c, The middle of the epididymis, composed of serpentine ducts.
 d, The head, or anterior part of the epididymis.
 e, e, &c. The coni vasculosi, which compose the head of the epididymis, separated a little from each other.
 f, f, The vasa efferentia.
 g, g, The rete testis.
 h, h, The vasa recta.
 i, i, The substance of the testicle.

FIG. 7.

Represents the BODY of the TESTICLE, and TUNICA ALBUGINEA.

- A, The naked pulpy-like substance of the testicle. The lines running across seem to indicate the septulæ which divide the ducts of the testicle into bundles.
 B, The outer, and,
 C, The inner concave part of the tunica albuginea, which contains and adheres to the pulp of the testicle.

FIG. 8.

The TESTICLE cut longitudinally, from before backwards, to shew its INTERNAL STRUCTURE.

- A, A, The seminal tubes collected into bundles between their septulæ.
 B, B, The seminal tubes running through the membranous substance of the testicle.
 C, C, A portion of the seminal tubes, cut across, where they perforate the tunica albuginea.
 D, D, D, D, The tunica albuginea, cut at the fore-part of the testicle, and turned back.

FIG.

FIG. 9.

A View of the Under and Back Part of the BLADDER, with the VESICULÆ SEMINALES, and PROSTATE GLAND.

- A, The under and back part of the bladder.
 B, B, The termination of the ureters in the bladder.
 C, C, The vasa deferentia.
 D, D, The vesiculæ feminales.
 E, The prostate gland.
 F, The urethra.

FIG. 10.

Represents the Communication of the VASA DEFERENTIA, with the VESICULÆ SEMINALES, their CAVITIES being laid open.

- A, A, Part of the vasa deferentia, with thick sides and small cavities.
 B, B, The vasa deferentia, with thin sides and large cavities, where they approach the vesiculæ.
 C, C, The vasa deferentia again contracted, where they communicate with the vesiculæ.
 D, D, D, D, The vesiculæ feminales expanded, to shew their contractions and dilatations.
 E, E, The duct common to each vas deferens, and vesicula feminalis of the same side.
 F, F, The two common feminal ducts, adhering together, without any communication between their cavities.
 G, G, The part where the feminal ducts open into the urethra.
 H, H, Vessels running to the vesiculæ feminales.
 I, The membrane which connects the vesiculæ feminales and vasa deferentia to each other.

FIG. 11.

A Section of the Anterior Part of the PENIS, with the URETHRA laid open.

- A, A, The corpus spongiosum urethræ and urethra, cut longitudinally at their under side, and spread out. Between B and C, the orifices of the mucous follicles are seen.
 D, One of the mucous follicles, larger than the rest, distended.
 E, The ligamentum suspensorium penis.
 F, F, A membrane continued from the ligamentum suspensorium, and represented as surrounding the penis.
 G, Part of this membrane separated from the body of the penis, and turned back.
 H, Part of the prepuce turned back.
 I, The frænum.
 K, The corona glandis, beset with many sebaceous follicles.—A few of these are likewise seen upon the frænum and inside of the prepuce.

FIG. 12.

A Lateral and Longitudinal Section of the Fore-part of the PENIS.

- A, A, The corpora cavernosa penis.
 B, B, The septum penis.
 C, The corpus cavernosum glandis.
 D, The outer surface of one of the corpora cavernosa.

FIG. 13.

A Transverse Section of the PENIS.

- A, A, The corpora cavernosa penis.
 B, The septum penis.
 C, The corpus spongiosum urethræ.
 D, The urethra.
 E, E, The partition between the corpora cavernosa penis and corpus spongiosum urethræ.

Fig. 6.



Fig. 7.



Fig. 5.



Fig. 8.



Fig. 1.

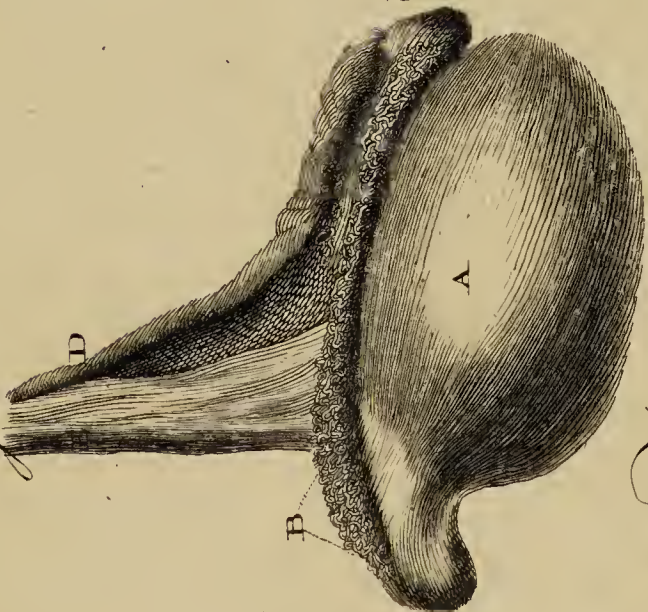


Fig. 2.

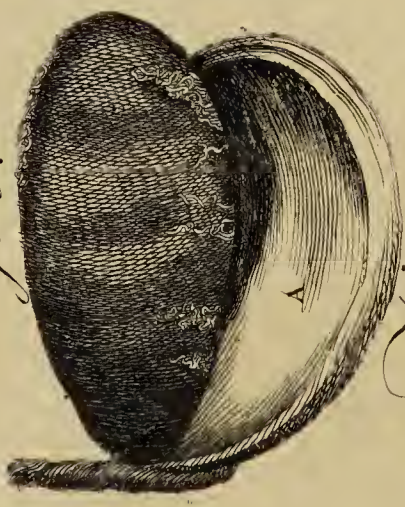


Fig. 3.



Fig. 4.



T A B L E XCIX.

VIEWS of the TESTICLE and VESICULÆ SEMINALES;—the TUBULI SEMINIFERI having been filled with Quick-silver.

FIG. 1.

A View of the TESTICLE and EPIDIDYMIS.

- A, The tunica albuginea.
 B, The head of the epididymis, or globus major.—Between B and C, The body of the epididymis.
 C, The posterior and under part of the epididymis, named Globus Minor.
 D, E, The spermatic cord.—D, The vas deferens.

FIG. 2.

The Tunica Albuginea A, cut and drawn back, but left adhering to the Body of the Testicle, where some of the convoluted Seminal Vessels appear.

FIG. 3.

The Body of the Testicle, in the Anterior Part of which a Longitudinal Incision has been made, and the two sides separated a certain way from each other,—to shew the situation of the Seminal Ducts, and their Course towards the back part of the Testicle.

FIG. 4.

Explained Tab. XCVIII. Fig. 6.

FIG. 5.

The SPERMATIC VESSELS of the TESTICLE of a BOAR.

- A, The femoral convoluted ducts passing to the back part of the testicle.
 B, The vasa efferentia.
 C, C, The body of the epididymis.
 D, D, The vas deferens.
 E, E, Numerous lymphatic vessels arising from the body of the testicle, and ascending in the spermatic cord.

FIG. 6.

The VAS DEFERENS, with Part of the EPIDIDYMIS, unravelled.

- A, The vas deferens.
 B, The termination of the epididymis.
 b, b, The epididymis drawn out to a single duct.
 C, The beginning of the epididymis.
 D, The body of the testicle covered by the tunica albuginea.

FIG. 7. & 8.

The VESICULÆ SEMINALES injected with Wax, and their Parts unravelled.

- a, The vas deferens.
 b, The vesiculæ seminales.
 c, The duct common to the vas deferens and vesiculæ seminales.

OF THE ORGANS OF URINE, AND OF THE UNIMPREGNATED PARTS OF GENERATION, IN THE FEMALE.

THE *Kidneys*, *Renal Glands*, and *Ureters*, have the same situation and structure as in the Male.

The *Bladder* also has the same situation behind the *Ossa Pubis*, but rises higher when it is in the distended state.

It is proportionally larger than the *Bladder* of the Male, and is broader from one side to the other, corresponding to the Cavity of the Pelvis to which it belongs.

The *Urethra* is much shorter,—being scarcely two inches in length,—and straighter than in the Male, having only a slight bend downwards between its extremities.

It is produced from the most depending part of the *Bladder*, has no *Prostate Gland*, but is furnished, as in the Male, with *Lacunæ*, which open into it, and discharge a *Mucus* to defend it from the Urine.

The Parts of Generation are divided into *Internal* and *External*. The former consist of the *Uterus* and its *Appendages*.

INTERNAL PARTS.

The *Uterus*, *Matrix*, or *Womb*, is a hollow Viscus, situated in the Pelvis, in the Hypogastric Region, between the *Bladder* and *Rectum*, with which it is connected. Tab. CIV.

It is of a *Triangular figure*, and a little flattened before and behind, but more so anteriorly; is large above, small below, and has two Angles at its upper and lateral parts, called *Corners* of the *Uterus*.

It is distinguished into *Fundus* or upper part, which includes the space above the insertion of the *Fallopian Tubes*, the *Body* or middle, and *Cervix* or under part; the two last being nearly of equal length.

The extent and figure of the *Uterus* varies considerably in different Subjects.—In Women who have never been pregnant, it is commonly about two inches and a half in length, from one inch and a half to two inches in breadth at the *Fundus*, and about half as broad at the *Cervix*.—It is near an inch in thickness, and is larger in Women who have born Children, than in Virgins.

The Cavity, like the external part of the *Uterus*, is of a *triangular form*, but is small in proportion to the size of the Organ;—being scarcely capable of containing the Kernel of an Almond,—and has its sides closely applied to each other. Tab. CVII. Fig. 3.

It is covered externally through its whole length with a smooth polished Coat, continued from the *Peritoneum*, which, at the under part of the *Cervix*, is reflected forwards upon the *Bladder*, backwards over the *Rectum*, and laterally towards the Sides of the Pelvis.

Its Substance is of a compact, cellular, and fleshy nature, and plentifully supplied with Blood-vessels: The *Fleshy Fibres*, however, are seen distinctly only in the *Gravid Uterus*.

It is remarkably Vascular in its Body, less so in its *Cervix*, and is nearly of the same thickness throughout, excepting at its Corners, where the *Uterine* or *Fallopian Tubes* terminate.

It is lined with a fine and very Vascular Membrane, of a somewhat Porous and Villous appearance, in which the *Arteries* terminate which discharge the *Menstrual Fluid*.

The Cavity of the *Cervix* has two small *Longitudinal Lines* projecting in it, one in the anterior, the other in the posterior part, on each side of which are numerous *Rugæ*. Tab. CVII. Fig. 3. K, K.

The *Rugæ* run in an oblique-transverse direction, and are formed, not only of the inner Membrane, but also by the *Fibres* which compose the Body of the *Uterus*.

Between the *Rugæ* are many small *Follicles*, which discharge a *Mucus* for lubricating the parts near which they are placed:—Some of them, being of a roundish form, were mistaken by NABOTH for Female *Ovula*. Tab. CVII. Fig. 3. K, K.

The under part of the *Cervix* projects into the *Vagina*, somewhat in form of the *Glans Penis*, and is perforated by a transverse Slit, termed *Os Tincæ*. Tab. CI. Fig. 3. D.

The *Os Tincæ*, in a Virgin *Uterus*, is about the size of the orifice of the *Urethra* in the Male, but nearly twice as large in the *Uterus* of a Woman who has born Children. Tab. CIV. Tab. CII.

It is smooth on its external surface, is placed obliquely, in a direction towards the back part of the *Vagina*, Tab. CIV. and is surrounded with several *Mucous Follicles*.

The *Appendages* of the *Uterus*, are the *Broad* and *Round Ligaments*, the *Ovaria*, the *Fallopian Tubes*, and the *Vagina*.

The *Ligamenta Lata*, termed sometimes *Ala Vespertilionis*, are two Membranous productions, or Doublings of

of the Peritoneum, sent from the edges of the Uterus and posterior extremity of the Vagina, to be fixed to the sides of the Pelvis. Tab. CIII. Fig. 1. G, G.

The Uterus and they separate the Pelvis into anterior and posterior Cavities, and are themselves divided into large and small, or anterior or posterior Alæ or Pinions.

They contain and support the Ovaria and Uterine Tubes, with part of the Spermatic and Uterine Vessels and Nerves; inclose a portion of the Ligamenta Rotunda, &c. connect the Uterus to the sides of the Pelvis, and assist in retaining it in its place. In the time of Gestation they become effaced, by furnishing the Uterus with part of its external covering.

The *Ligamenta Rotunda* are two long and slender Cords, composed of Vessels and Ligamentous Fibres, arising from the Corners of the Uterus, immediately before and below the Fallopian Tubes, from which they descend obliquely in the Ligamenta Lata, diminishing a little in their course towards the Groins. Tab. CI. Fig. 3. K, K. Tab. CIV.

They pass through the Rings of the Abdominal Muscles, in the same manner as the Spermatic Cords do in the Male, and are afterwards inserted by separate Branches into the upper and lateral parts of the Pudendum, where they are insensibly lost.

They assist the Ligamenta Lata in preserving the equilibrium of the Uterus.

The *Ovaria*, anciently called *Testes Muliebres*, are situated at the sides of the Fundus Uteri, about an inch distant from it, and are contained in the posterior Pinions of the Ligamenta Lata, which form a Coat to them similar to the Tunica Albuginea Testis.

The *Ovaria* are plain above, and prominent and semi-oval below, flattened at their anterior and posterior Surfaces, and the size of each, when in a state of the greatest maturity, is nearly equal to half of the Male Testicle. Tab. CII. Fig. 1. D, D.

In the vigour of life, they are large, uniform, and smooth, but become small, unequal, and shrivelled, in Old Women, and in those who have born many Children. Tab. CIV. Tab. CV.

They are attached to the Uterus by the Ligamenta Lata, and by two small Cords, termed *Ligamenta Rotunda Ovarii*, which were mistaken by the Ancients for Vasa Deferentia, carrying a secreted Liquor to the Uterus.

They are composed internally of a loose whitish Cellular Substance, intermixed with Vessels and Nerves, and contain a number of small Vesicles, called *Ova*, filled with a limpid Fluid, which partakes of the qualities of the White of an Egg.

These Vesicles differ much in size in the same Ovarium;—the largest of them are seldom equal to the size of a small Garden-pea. Tab. CII. Fig. 1. F.

The number of *Ova* is differently estimated by different Anatomists;—from ten to twenty and upwards having been found in one Ovarium.

According to Experiments made by Mr HUNTER, it

is ascertained,—that the number of originally existing *Ova* in each Ovarium, whether that number be greater or smaller, may be diminished, but cannot be increased.

The *Ovaria* serve for the nourishment of the *Ova*, which contain the Rudiments of the Fœtus.

The *Uterine*, or *Fallopian Tubes*, Tab. CII. Fig. 1. K, K. Tab. CIV. compared in shape, by FALLOPIUS, to that of a Trumpet, are two Conical and Vermiform Canals, attached to the Corners of the Uterus, and terminating in it, each by a *small Opening* which scarcely admits the entrance of a Bristle. Tab. CVII. Fig. 4. C.

They become gradually larger in their passage towards the sides of the Pelvis: Near their outer extremity, they are convoluted and considerably dilated, but are afterwards suddenly contracted, and terminate by *open Mouths* sufficiently large to admit the point of a Goose-quill. Tab. CIII. Fig. 1. B, B. Tab. CIV.

Their outer ends are free and fluctuating in the Pelvis, and expand into many irregular jagged or pointed extremities, called *Fimbriae*, which are considerably longer at one side of the Tube than the other. Tab. CIII. Tab. CIV.

They are commonly upwards of a hand-breadth in length, and contained in a Doubling of the Ligamenta Lata.—In their natural situation, they lie near the *Ovaria*; but when drawn out and extended, are a finger's-breadth distant from them.

The Structure of the Tubes is nearly the same with that of the Uterus, and, like it, they are capable of dilatation and contraction: Their inner side, however, has a different appearance, being furnished with many small longitudinal Plicæ, which are most conspicuous towards the outer extremities.

The Tubes are supposed to convey the prolific part of the Male Semen from the Uterus to the *Ovaria*, in order to fecundate the *Ova*; and by grasping that part of the Ovarium where the ripest Ovum is situated, to carry the Ovum, according to some Authors, or its Contents only, according to others, to be mixed with the Male Semen, and to be lodged in the Cavity of the Uterus.

The *Vagina* is a Membranous Canal, which extends from the Neck of the Uterus to the Opening of the Pudendum. Tab. CI. Fig. 3. M, N. Tab. CIII. Tab. CIV.

It is situated at the under and back part of the Bladder and Urethra, and over the under part of the Intestinum Rectum; to each of which it is closely connected by Cellular Substance. Tab. CIV.

It begins a little above the Internal Orifice of the Uterus, but reaches higher at the posterior than anterior part; from which circumstance, together with a slight Curvature it has backwards, the Canal is found to be longer in its posterior than Anterior Surface.

From the Os Tincæ it passes downwards and forwards, and terminates between the Labia Pudendi; the Axis of the Vagina forming a considerable angle with that of the Uterus. Tab. CIV. Tab. CCII.

The

The dimensions of the Vagina correspond with the size of the Penis in the Male; but vary according to the temperament of the Body, and become larger in Women who have born Children.

The Body of the Vagina is composed of thick, strong, Membranous parts, and furnished internally with numerous irregular *Rugæ* or Wrinkles, and Nervous *Papillæ*; the former of which considerably diminish the capacity of the Canal, and the latter add to its sensibility. Tab. CI. Fig. 3. Tab. CIII. Fig. 1.

The *Rugæ* run in a transverse direction, and are so disposed as to divide the Vagina into anterior and posterior *Columns*, which join together laterally, and produce a *Rophé* at the right and left sides.

They are deepest, largest, and most crowded upon the anterior and towards the outer part of the Vagina; are most conspicuous in Virgins, less so in married Women, and become more and more effaced in those who have born Children.—The *Rugæ* facilitate the distension of the Vagina during Child-birth.

The whole extent of the Vagina, particularly towards its outer extremity, is furnished with small *Follicles*; the Orifices of which can frequently be seen.

They supply a Mucus, with which the Canal is always lubricated, and which is discharged, in time of Coition, in such abundance, as to have been formerly considered as an emission of Female Semen.

The outer end of the Vagina is covered, on each side, by a Substance composed of Blood-vessels and Cells similar to those of the Penis, and described by DE GRAAF under the name of *Plexus Reteformis*, and by later Anatomists, under that of *Corpus Cavernosum Vaginae*.

The *Corpora Cavernosa* are covered by the Sphincter Vaginae, the action of which, joined to the Dilatation of these Bodies, serves to contract the Entry of the Vagina in the time of Coition.

The Vagina receives the Penis and Semen, and conveys from the Uterus the Menstrual Flux, the Fœtus, the Secundines, and the Lochia.

The Uterus, with its Ligaments, Ovaria, and Uterine Tubes, are supplied with Blood from the Spermatic and Uterine Arteries.

The *Spermatic Arteries* arise from the Aorta, and, as in the Male, descend for some way through the Abdomen. They then run in the Ligamenta Lata, to be dispersed upon the Ovaria and Uterine Tubes, and afterwards upon the Uterus itself.

The *Uterine Arteries* are derived from the Internal Iliacs, and are much larger than the Spermatics. They direct their course, first to the under part of the Uterus, after which they descend along its edges, and near its upper part join the Spermatic Arteries.

Chiefly from the Uterine, and partly from the Spermatic Arteries, many small Branches are furnished, which run in a serpentine manner, and communicate with their fellows in the opposite sides of the Uterus.

The Vagina is supplied with an Artery on each side,

—termed *Vaginal*,—from the Uterine, and with small Branches from the Umbilical, Middle Hæmorrhoidal, and Pudic Arteries.

The *Spermatic Veins* have the same Termination as in the Male, but are considerably larger.—The other Veins run into the Internal Iliacs.

The Lymphatics, like the Blood-vessels, run also in two Sets. Those of the one Set accompany the Spermatic Blood-vessels, and, like the Absorbents of the Testes in the Male, go to the Lumbar Glands. Those of the other correspond with the Hypogastric Blood-vessels, and terminate in the Glands at the lateral parts of the Pelvis.

The *Nerves* are from the Sacral and Great Sympathetics.

The Uterus receives from the Ovaria, by means of the Fallopian Tubes, the Rudiments of the Fœtus,—nourishes it, and, after bringing it to maturity, expels it through the Os Internum Uteri and Vagina.—From the Inner Surface of the Uterus, the Menstrual Evacuation is also discharged.

EXTERNAL PARTS.

The *External Parts*, called *Pudendum* or *Vulva*, are formed of two prominent sides, termed *Labia Pudendi*, *Labia Externa*, or *Ala Majores*. Tab. CV. *b, b*. These are contiguous when the Limbs are not much separated, thereby preventing the access of Air to the Internal Parts, which they at the same time protect and conceal.

The upper part of the Pudendum, named *Pubes*, or *Mons Veneris*, is situated on the fore-side of the Os Pubis, and is covered with Hair similar to that in the Male, Tab. CV. In both Sexes the Hairs begin to grow about the same period of life.

The Pubes is composed of the Common Integuments, under which a considerable quantity of Fat is situated, rendering it thick, soft, and prominent.

The *Labia Pudendi* extend from the Pubes to within about an inch of the Anus, the space between the Pudendum and Anus obtaining the name of *Perinæum*, Tab. CV. *n*, from a Moisture supposed to flow about this part of the Skin.—It is sometimes also called *Anterior Perinæum*, to distinguish it from that part which extends from the Anus to the Coccyx, termed by some Anatomists *Posterior Perinæum*. Tab. CV. *p*.

The Opening between the two Labia has the name of *Fossa Magna*—It increases a little in size and depth as it descends, and forms a small boat-like Cavity at its under extremity, termed *Fossa Navicularis*. Tab. CV. *m*.

The Labia are thickest above, becoming thinner below, and terminate in a transverse Fold of the Skin, named *Frænum*, *Furcula*, or *Fourchette*, which is frequently lacerated in the first Delivery. Tab. CV. *c*.

The Labia are composed of the Skin elevated by a large quantity of Cellular Substance and some Fat, and lined by a very Vascular Membrane, which is thin, tender,

der, and red like the inside of the Lips, and furnished with numerous Sebaceous Follicles, secreting a Liquor whereby the parts are preserved smooth and moist.

Between the upper ends of the Labia, is the Substance named *Clitoris*, and by some *Mentula Muliebris*,—not extending an inch in length, and little more than the third part of that in thickness, and tied down to the fore-part of the Symphysis Pubis. Tab. CV. d.

It is extremely Vascular and Nervous, and is composed, like the Penis in the Male, of two *Crura* and *Corpora Cavernosa*, contained in a Ligamentous Sheath, with a Septum between them.

The *Crura* are upwards of twice the length of the Body of the Clitoris, and, together with Muscles belonging to them, arise, as the Crura of the Penis do in the Male, from the Crura of the Ossa Ischia and Ossa Pubis.

The Clitoris is also provided with a *Ligamentum Suspensorium*, by which it is connected to the Ossa Pubis, and with a *Glans*, which, like that of the Penis, is extremely sensible, but has no Perforation in it for the passage of the Urine. Tab. CV. f.

It is covered by a continuation of the Skin of the Labia, which, at its inferior extremity, forms a Semilunar Fold, termed *Preputium Clitoridis*. Tab. CV. e.

The Prepuce is furnished with *Glandulae Odoriferae* upon its inner Surface, and with a small Frænum which fixes it to the Glans.

In the time of Coition, the Glans Clitoridis is supposed to produce nearly the same sensation in the Female, as the Glans Penis does in the Male.

At the under and outer part of the Clitoris are two Bodies, called *Nymphæ*; which arise narrow from the Prepuce and Glans, and run obliquely downwards and outwards along the inside of the Labia, increasing in breadth, but suddenly contracting again at their lower extremity. Tab. CV. g, g.

They are chiefly formed by a Production of the inside of the Labia, have the same florid colour with them, and in their natural state are contiguous, and cover the Orifice of the Urethra.

They are sometimes of unequal size, and not unfrequently, particularly in warm Climates, they project beyond the edges of the Labia.

Their Internal Structure consists of Cellular Substance, with a large proportion of Blood-vessels: They have also

many Nervous Papillæ, which renders them very sensible, and Sebaceous Follicles, the Contents of which prevent them from being injured by the Urine.

The Nymphæ assist in directing the course of the Urine from the Urethra, and in preventing the Air from entering the Vagina.—They also tend to enlarge the passage for the Child in the time of Parturition.

Between the Perinæum and Nymphæ, there is a *Vestibulum*, or smooth Cavity, which is most complete in Virgins, and leads to two Passages,—to the Urethra above, and to the Vagina below.

The Orifice of the Urethra is placed a little below the Glans of the Clitoris, and between the two Nymphæ, and is surrounded by a Spongy Eminence, which projects at its under part,—called by some Authors *Corpus Glandulosum*, or *Glandulae Prostatae Mulierum*. Tab. CV. b.

The Corpus Glandulosum is perforated by *Lacunæ*; some of which are of considerable depth, and discharge a Viscid Matter round the Orifice of the Urethra. Tab. CV. i, i. Tab. CV. k.

The Orifice of the Vagina, termed likewise *Os Externum Uteri*, is placed immediately under that of the Urethra, and is naturally straiter than the rest of the Canal; but in the Virgin state, is still more contracted by the Substance called *Hymen*, or *Circulus Membranosus*, which partly surrounds it. Tab. CV. l, l.

The Hymen approaches to a Circular Figure, but the Circle is frequently incomplete next the Orifice of the Urethra, the broad part being turned towards the Perinæum.

When the Hymen is ruptured, it degenerates into small Conical Papillæ, termed *Carunculæ Myrtiformes*, from their supposed resemblance to Myrtle-berries.

The Hymen has been considered as a test of Virginity;—but neither the presence nor the absence of this Membrane can be depended on as a certain Criterion.

About the Orifice of the Vagina are several Mucous Follicles, similar to those round the Opening of the Urethra.

The Blood-vessels and Nerves of the External Parts are from the Pudic Branches, and are dispersed in numerous Ramifications upon the end of the Vagina, Labia Externa, and Clitoris.

The Absorbents pass partly to the Inguinal Glands, and partly to those placed at the sides of the Pelvis, or upon the Lumbar Vertebrae.

T A B L E C.

Gives a VIEW of the CONTENTS of the FEMALE PELVIS.

-
- | | |
|--|---|
| A, A, The last lumbar vertebra. | a, a, a, a, That part of the uterus to which the neck of the bladder adhered. |
| B, B, The inner surface of the ossa ilia. | M, The os tinæ. |
| C, C, A section of the os innominatum. | N, N, The ligamenta lata. |
| D, D, The acetabula. | O, O, ————— rotunda. |
| E, E, The ovaria. | P, P, A section of the vagina. |
| F, F, The Fallopian tubes. | Q, Q, The upper, and, |
| G, The fimbriated extremity of the right tube embracing the corresponding ovarium. | R, The under part of the rectum. |
| H, The fimbriæ of the left tube, turned forwards to shew its orifice. | S, The cellular substance between the integuments and muscles of the nates. |
| I, The body, | T, T, The integuments of the nates. |
| K, The fundus, | U, The part covering the extremity of the coccyx. |
| L, The cervix of the uterus. | |

TABLE



TAB 101.

Fig. 1.

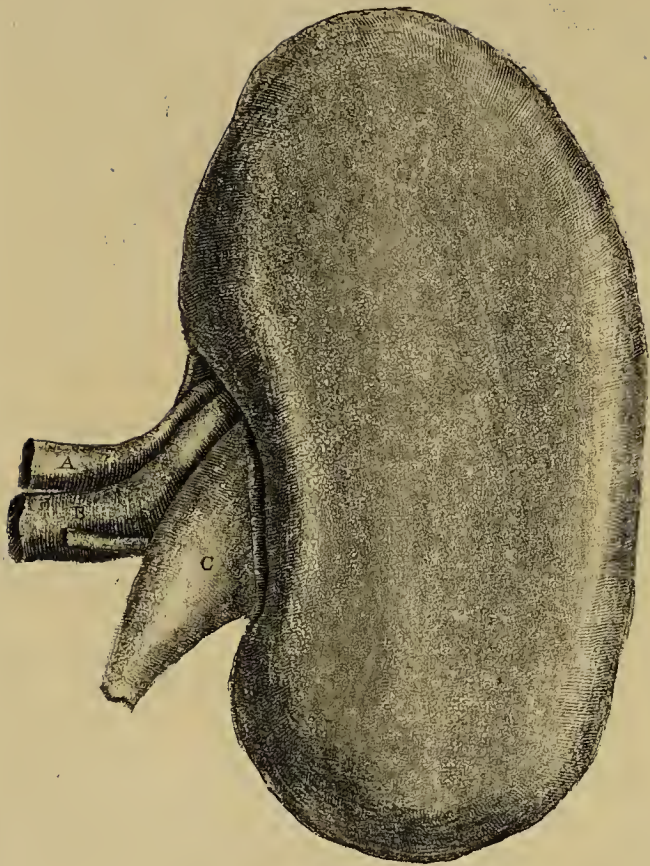


Fig. 2.

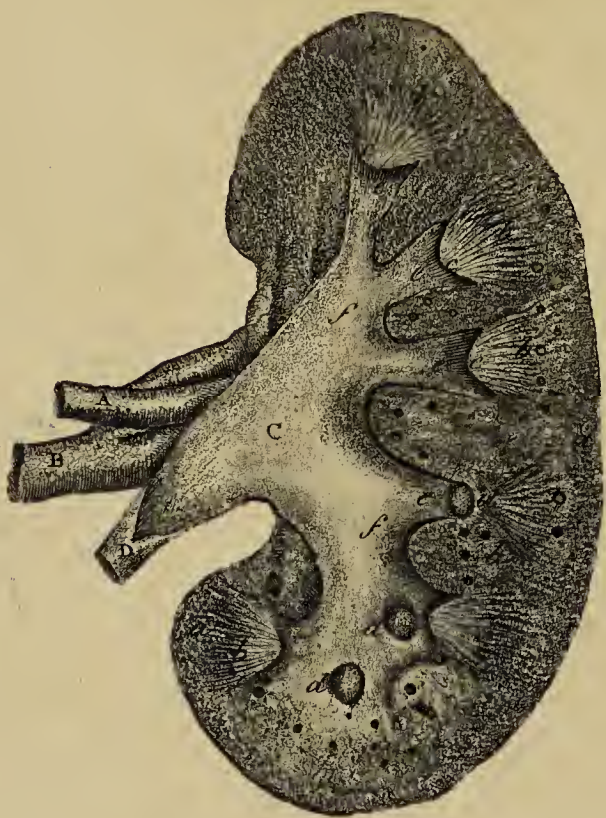
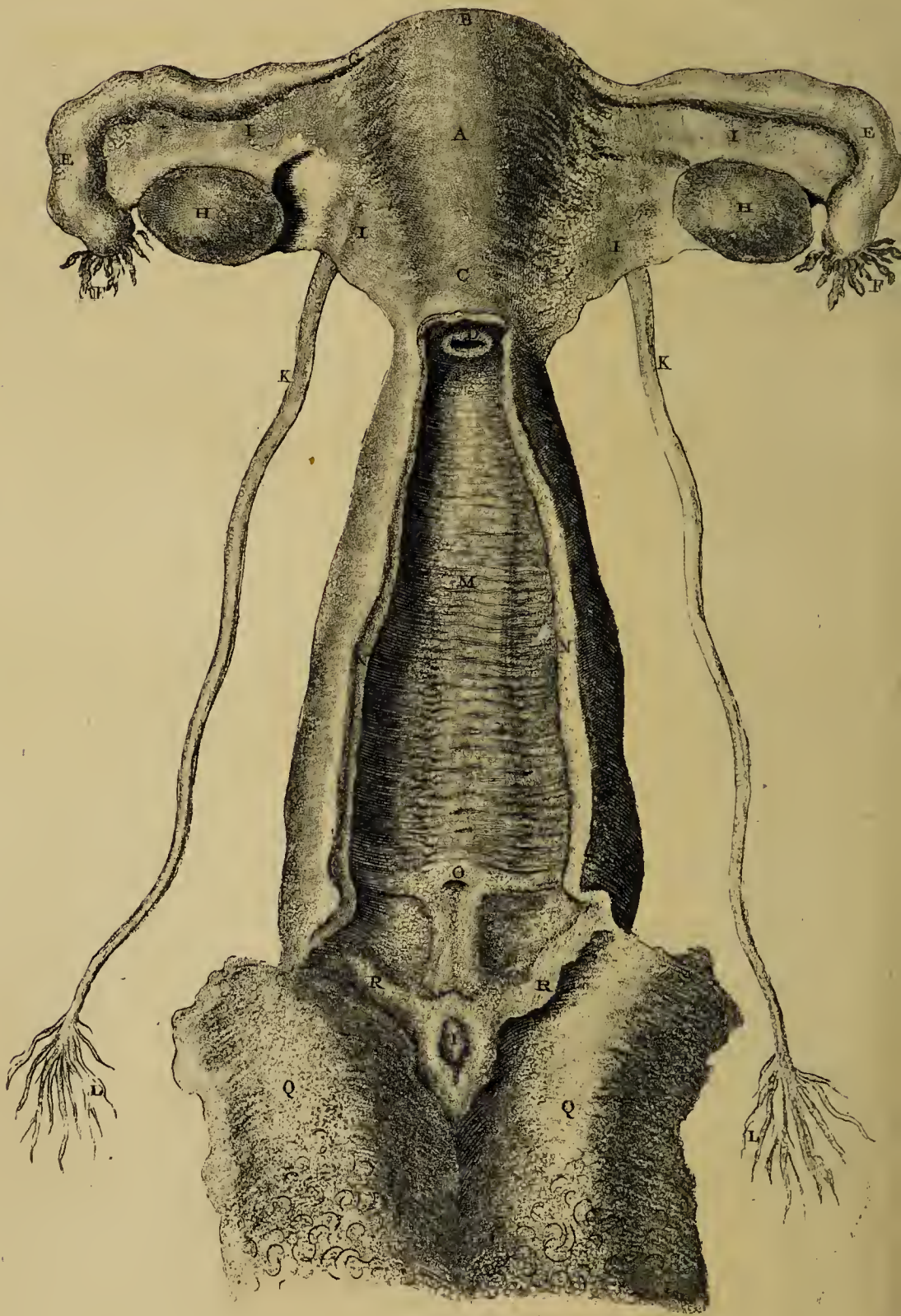


Fig. 3.



T A B L E C I.

VIEWS of the ORGANS of URINE and PARTS of GENERATION in the FEMALE.

FIG. 1.

A Posterior View of the Right KIDNEY, with its Vessels injected.

- A, The renal artery.
 B, The corresponding vein.
 C, The pelvis of the kidney forming the beginning of the ureter.

FIG. 2.

A Longitudinal Section of a different KIDNEY from that of Fig. 1.

- A, The renal artery.
 B, ——— vein.
a, a, &c. The termination of the renal artery and vein in the cortical part of the kidney.
b, b, &c. The uriniferous tubes, forming,
c, c, c, The papillæ.
d, d, d, The papillæ entire.
e, e, &c. A section of the infundibula.
f, f, The infundibula united into trunks, to form,
 C, The pelvis.
 D, The beginning of the ureter.

FIG. 3.

Shews the UTERUS, &c. entire; the VAGINA cut open, on the Side next the INTESTINUM RECTUM.

- A, The back part of the body of the uterus;
 B, Its fundus;
 C, Its cervix.
 D, The os tinæ.
 E, E, The Fallopian tubes.
 F, F, The fimbriæ.
 G, G, The termination of the tubes in the uterus;
 H, H, The ovaria.
 I, I, &c. The ligamenta lata.
 K, K, ——— rotunda.
 L, L, Their extremities.
 M, The inside of the vagina, with its rugæ.
 N, N, The cut edge of the vagina.
 O, The orifice of the urethra.
 P, The glans clitoridis, surrounded by its prepuce.
 Q, Q, The labia externa.
 R, R, The nymphæ.

TABLE CH.

VIEWS of the UTERUS.

FIG. 1.

A View of the UTERUS a few days after Impregnation.

- A, A, The body of the uterus cut open, by which its thickness and cavity appear.
 B, The os tinæ.
 C, C, The part to which the vagina adhered.
 D, D, The ovaria, one of which is cut open.
 E, An ovum fœcundated.
 F, Vesicles not fœcundated.
 G, Blood-vessels in the cellular substance.
 H, A prominence occasioned by the contained ova.

I, I, The ligaments of the ovaria.

K, K, The Fallopian tubes cut open at their outer extremities.

L, L, Portions of the ligamenta lata.

M, M, ————— rotunda.

FIG. 2.

A View of the UTERUS of a WOMAN who was killed a few hours after Coition.

- A, B, A fluid found in the cavity of the uterus, and at the os internum uteri, supposed to be the male semen.

TABLE

Fig. 1.

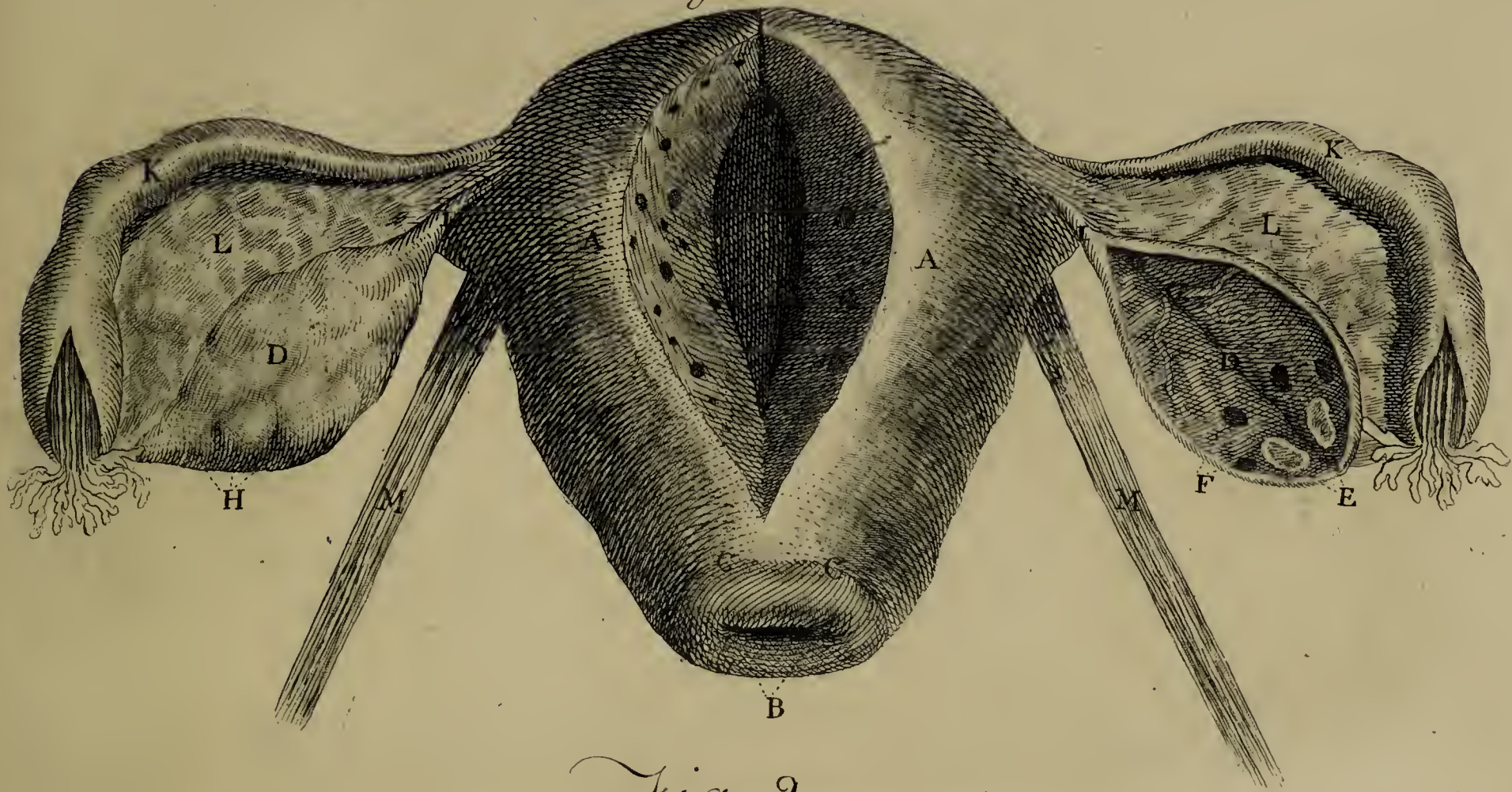


Fig. 2.

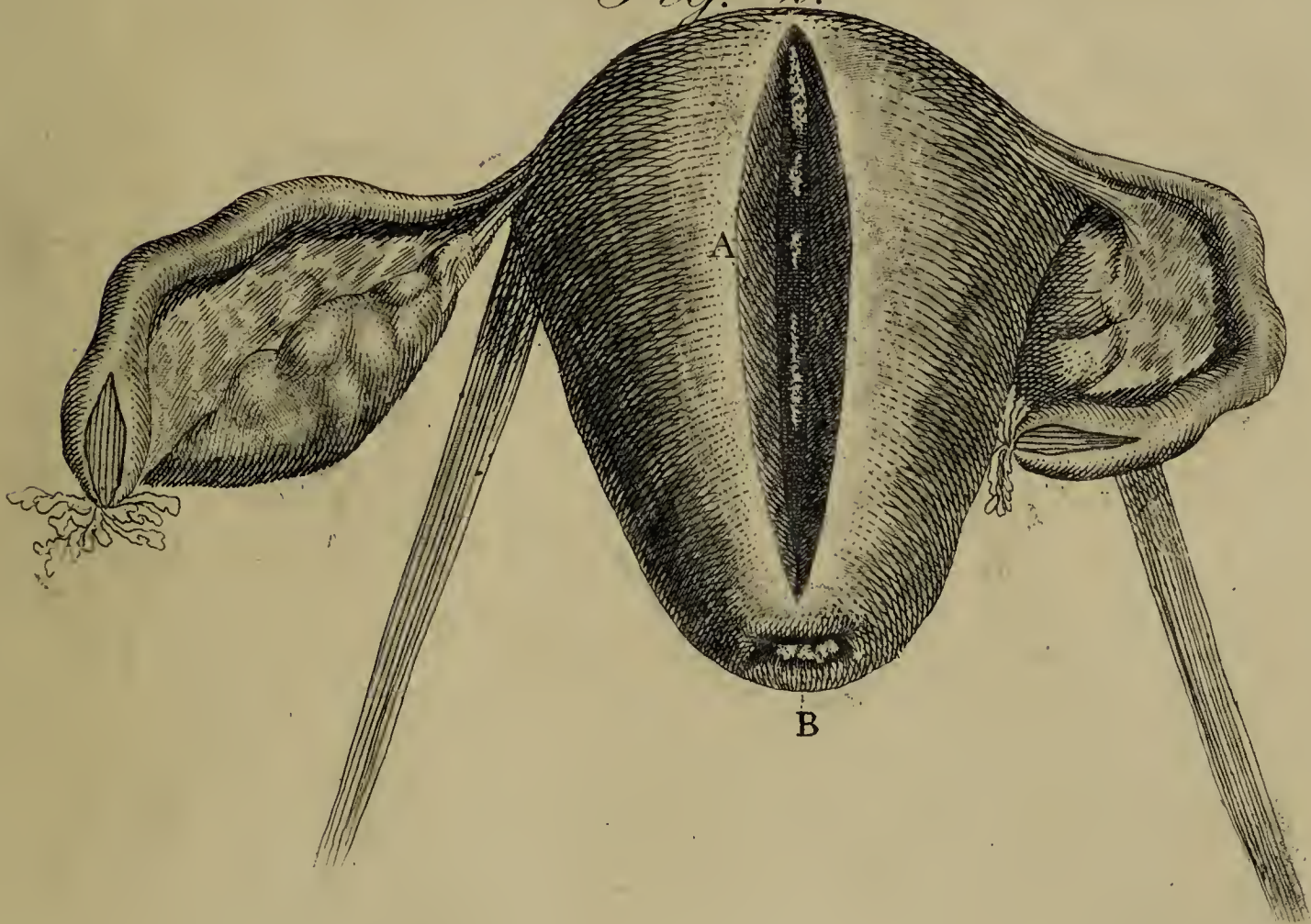




Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

T A B L E CIII.

VIEWS of the UTERINE SYSTEM.

FIG. 1.

Represents the UTERUS and VAGINA laid open.

- A, A, The ovaria, the left, which is dropfical, laid open.
 a, a, The ligaments of the ovaria.
 B, B, The Fallopian tubes, distended with air, introduced by their orifices, *b, b.*—The air readily passed into the cavity of the uterus.—The large convolutions of the right tube are left out on account of the smallness of the plate.
 C, C, The fimbriated extremities of the tubes.
 D, D, A longitudinal section of the uterus.
 E, E, The cavity of the uterus.
 c, A small excrescence in this uterus.
 F, A fimilar excrescence obstructing the passage into the uterus.
 d, The os tincæ laid open.
 e, e, Hydatids upon the mouth of the uterus.
 G, G, The ligamenta lata.
 f, f, ————— rotunda.
 H, H, The vagina laid open. In the anterior part it is rugous, in the posterior part smooth.
 g, g, The lacunæ in the cavity of the vagina.
 I, The orifice of the urethra placed in a glandular eminence.
 b, A lacuna situated upon the glandular body.
 i, i, Two ventricles appearing in the vestibule of the vagina.
 K, The clitoris, with its surrounding prepuce.
 k, k, The lacunæ in the ventricles of the vestibule.
 l, l, The lacunæ, called *Ductus BARTHOLINI.*
 m, m, The carunculæ myrtiformes.
 n, n, A section of the labia.
 L, L, The nymphæ preternaturally large.
 M, M, The labia pudendi.

FIG. 2.

A View of the Os INTERNUM and part of the VAGINA, in a GIRL of Fourteen years of age. The VAGINA is cut Longitudinally upon the Right Side.

- A, The rima transversa of the os uteri.
 B, B, The vagina, with rugæ more simple than those found on its fore-part.

FIG. 3.

A View of the Internal Parts of the PUDENDUM of the same GIRL, as in the former Figure.

- A, A, The labia pudendi.
 B, The clitoris.
 C, C, The nymphæ.
 D, D, The hymen, of a semicircular figure.
 E, The fossa navicularis.

FIG. 4.

The External Parts of a CHILD a few weeks old.

- A, A, The labia.
 B, The clitoris.
 C, The urethra.
 D, D, The hymen, of a circular form.

FIG. 5.

Represents the HYMEN large and semilunar, in a GIRL of seven years of age.

The letters point to the same parts as in Fig. 3.

T A B L E : CIV.

A Side-View of the CONTENTS of the PELVIS in a Young Female ; the Left Os INNOMINATUM being separated.

-
- | | |
|---|--|
| <p>A, The anterior surface of the os sacrum, covered by cellular substance.</p> <p>B, The cartilaginous surface of the os sacrum, which was joined to the os ilium.</p> <p>C, The cartilaginous surface of the right os pubis, which formed part of the symphysis pubis.</p> <p>D, The psoas muscle.</p> <p>E, A section of the muscles placed in the back part of the loins.</p> <p>F, A section of the pyriformis.</p> <p>G, ————— glutei.</p> <p>H, The levator ani raised from its origin, and turned back, with a cut in it, to shew,</p> <p>I, The point of the os coccygis.</p> <p>K, Part of the sphincter ani.</p> <p>L, The transversalis perinei separated from the os ischium.</p> <p>M, The sphincter vaginae covering the corpus cavernosum vaginae.</p> <p>N, The erector clitoridis.</p> <p>O, The left crus clitoridis.</p> <p>P, The body of the clitoris, and the angle it forms with its crus.</p> <p>Q, The suspensorium clitoridis.</p> <p>R, The mons Veneris.</p> <p>S, The left, and,</p> <p>T, A part of the right labium pudendi.</p> <p>U, The right thigh.</p> <p>V, The left ureter ;</p> <p>W, Its termination in the bladder.</p> <p>X, X, The bladder of urine moderately distended, and covered above and behind by the peritoneum.</p> <p>Y, Y, The fleshy surface of the bladder.</p> <p>Z, The urethra, with a catheter introduced into the bladder.</p> | <p>a, b, The end of the colon and the intestinum rectum distended, resting upon the lumbar vertebrae and top of the os sacrum.</p> <p>c, The cut edge of the peritoneum, and its depth in the pelvis, in this state of the viscera.</p> <p>d, The fleshy surface of the rectum.</p> <p>e, f, The posterior surface of the unimpregnated uterus, which is drawn upwards, so as to bring it fully into view ; e, its body ; f, its cervix.</p> <p>g, g, The ligamenta lata drawn upwards ; the left, with the parts connected to it, is expanded upon the side of the bladder ; the right, with the parts it includes, is turned backwards upon the side of the pelvis.</p> <p>h, The left ligamentum rotundum uteri obscurely seen.</p> <p>i, i, The two ovaria, with their flat upper, and rounded under edges.</p> <p>k, The left ligamentum rotundum ovarii.</p> <p>l, l, The uterine tubes ; their shape and size are distinctly seen, in consequence of their having been drawn in the distended state.</p> <p>m, m, The external orifices of the tubes, with the fimbriae surrounding them, which are spread out, and considerably longer at one side of the tubes than at the other.</p> <p>n, n, The vagina cut open.</p> <p>o, The inside of the vagina, with its transverse rugae, which are most numerous towards its outer extremity.</p> <p>p, The os tincae placed transversely at the posterior part of the vagina.</p> <p>q, The spermatic blood-vessels of the right side.</p> <p>*** Are placed opposite to the external orifices of the urethra, vagina, and rectum.</p> |
|---|--|



TAB. 105.

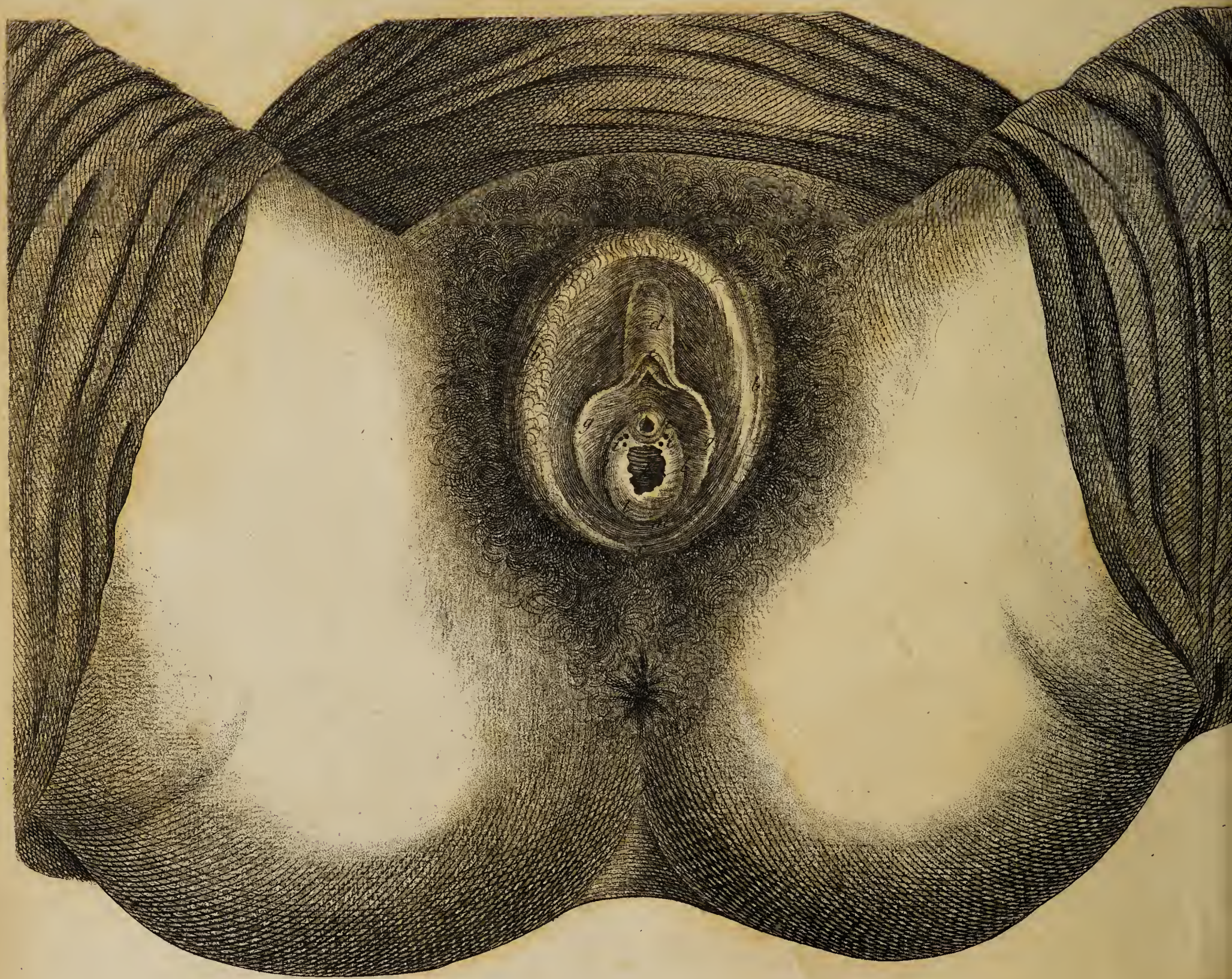


TABLE CV.

The EXTERNAL PARTS of GENERATION of the FEMALE, in the Virgin State.

- | | |
|---|---|
| A, A, A, The drapery covering part of the abdomen and thighs. | b, The orifice of the urethra. |
| a, The mons veneris. | i, i, The orifices of mucous lacunæ. |
| b, b, The labia pudendi separated. | k, The orifice of the vagina, with some of the rugæ seen upon its internal surface. |
| c, The frænum labiorum. | l, l, l, The hymen. |
| d, The clitoris. | m, The fossa navicularis. |
| e, The preputium, and, | n, The anterior perineum. |
| f, The glans clitoridis. | o, The anus. |
| g, g, The nymphæ turned outwards. | p, The posterior perineum. |

TABLE

T A B L E C V I.

FIG. 1.

The EXTERNAL PARTS of an HERMAPHRODITE NEGRO, who was twenty-six years of Age, and in Shape perfectly Male.

- a*, The clitoris, which, when erected, was said to be almost as large as the penis.
- b*, The glans clitoridis.
- c, c*, The labia, or a divided scrotum, in which were perfect testicles, with all the vessels.
- d, d*, The nymphæ.
- e*, The entrance into the vagina, where there were carunculæ myrtiformes.
- f*, The furca virginis.

FIG. 2.

The EXTERNAL PARTS of another HERMAPHRODITE, whose Shape was said to be rather Female than Male; but too young to have Breasts like a Female, or a Beard upon the Face like a Male.

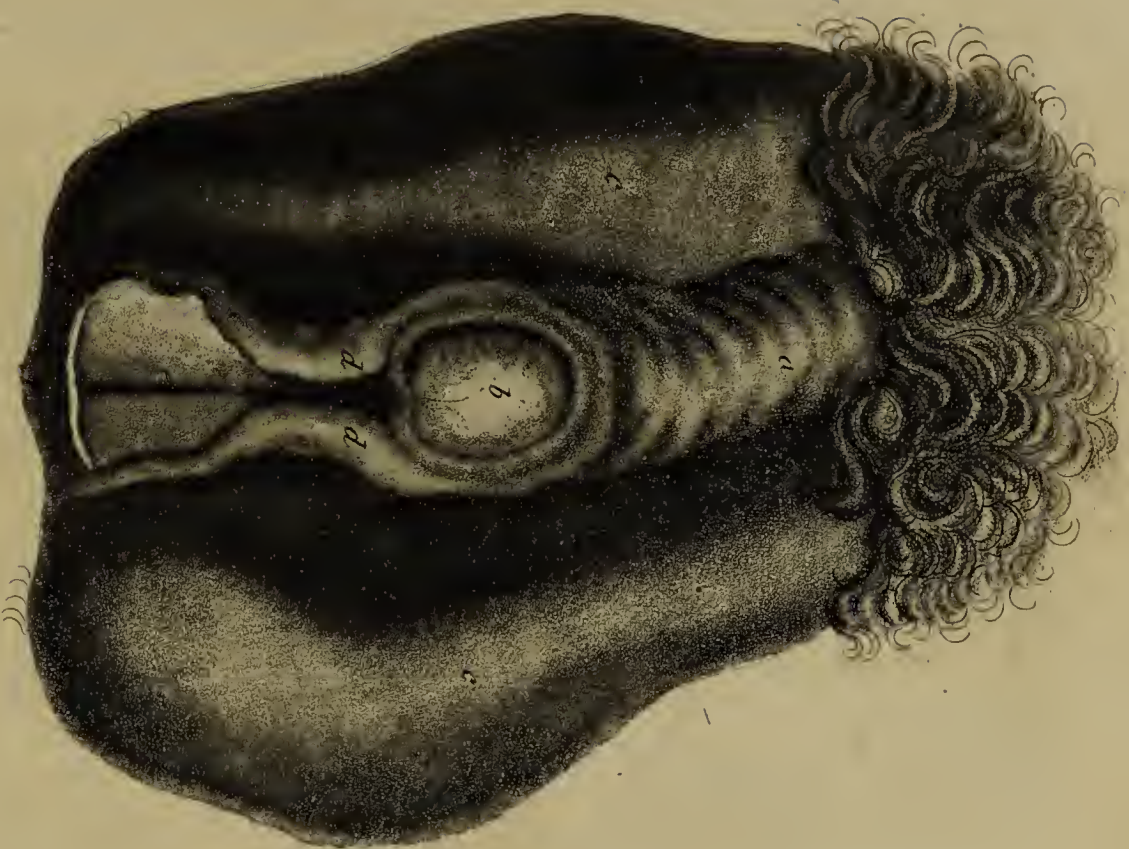
- a*, The glans clitoridis.
- b, b*, The nymphæ.
- c, c*, The labia, with testicles in them, separated from each other, to shew the parts between them, but in their natural situation like the labia represented in the preceding figure.
- d*, The entrance into the vagina.
- e*, The furca virginis.

FIG. 3.

The EXTERNAL PARTS of an HERMAPHRODITE CHILD, who died from a Disease in the ABDOMEN, when three years old.

- a*, The mons veneris furnished with red hair.
 - b, b*, The labia as thick as those of a grown woman, but shorter, also furnished with some red hair. Their inner surface is white and rugous, the fine red skin not beginning till near the external orifice of the vagina.
 - c*, The clitoris projecting, which is upwards of an inch in length, and about half an inch in diameter.
 - d*, A thick wrinkled prepuce.
 - e*, The glans of the clitoris, in which is seen an appearance of the orifice of an urethra, but which is only a deep channel descending to the vagina, and is like the male urethra slit open.
 - f, f*, The nymphæ, which form the sides of the above-mentioned channel.
 - g*, A longitudinal eminence like the veru-montanum.
 - h*, The hymen, surrounding the orifice of the vagina. Between the hymen and the glans, the orifice of the urethra is concealed.
- The size and shape of the uterus belonging to the preparation from which this figure is made, is equal to that of a girl of fourteen years of age. The os tinæ is impervious.
- The Fallopian tubes are knotted in their course, like vasa deferentia.
- The ovaria correspond in size to the developement of the other parts of the uterine system.

Fig. 1.



TAB. 106.

Fig. 2.

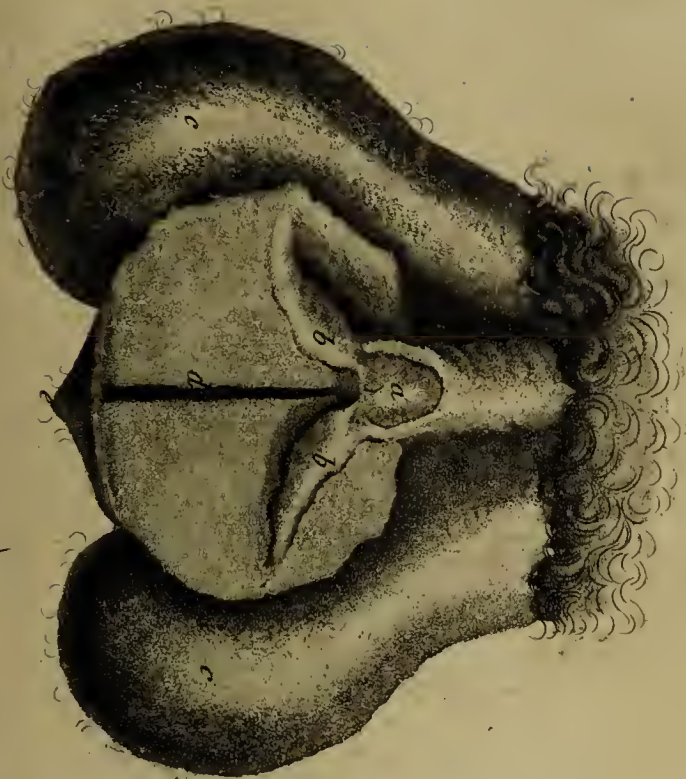
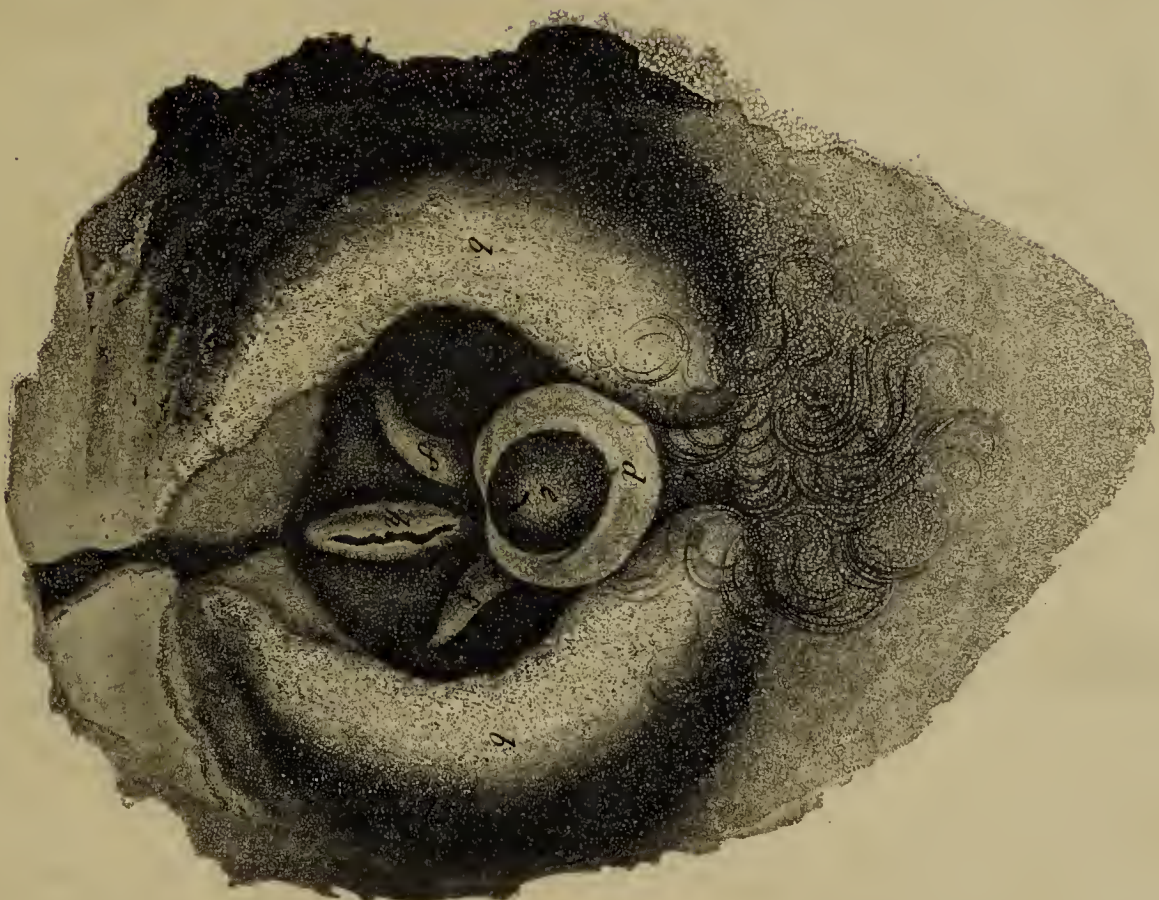


Fig. 3.



OF THE GRAVID UTERUS.

WHEN the Rudiments of the Fœtus have been conveyed from one of the Ovaria into the Cavity of the Uterus, through the medium of the corresponding Uterine Tube, whether in the state of a Fluid only, or of a complete Ovum, *Impregnation* is said to have taken place.

Some days after Impregnation has taken place, an *Ovum*, consisting of a Vesicle filled with a limpid Fluid, is found in the Cavity of the Uterus.

The Ovum, when first visible, is observed to have a smooth Surface, but in a short time thereafter it sends off flocculent Branches, the greater part of which are by degrees converted into a *Placenta* at that part of the Uterus where the Ovum happens to be first attached.

The Rudiments of the Fœtus, however, are not always conveyed to the Uterus after Impregnation, for sometimes a Fœtus is found in the Ovarium; at other times in one of the Uterine Tubes; and some rare instances have occurred, where the Embryo has dropped from one of the Ovaria or Tubes into the Cavity of the Abdomen, where a Placenta has been formed, by which it has been nourished.

The Ovum, at an early period of Gestation, consists of a thin *Membranous Capsule*, which incloses the Embryo or Germ with the Umbilical Cord and Waters; and the Capsule, again, consists of an internal Membrane called *Amnios*, on the outside of which is the *True Chorion*, which is covered with a Filamentous and Spongy Substance, termed by RUYSCH *Tunica Filamentosa*, and by more modern Authors, the *False* or *Spongy Chorion*. Tab. CIV. Fig. 1.—5. Tab. CXI. Fig. 4.

The *Spongy Chorion* is described by DR HUNTER as consisting, in early Gestation, of *two Layers*; one lining the Cavity of the Uterus, and termed by him *Membrana Decidua*, from being supposed to be cast off from the Uterus: The other, covering that part of the Ovum which does not adhere to the Uterus, he terms *Decidua Reflexa*. Tab. CXI. Fig. 4.

The *Decidua* is least distinct between the Uterus and Placenta. Near the edge of the Placenta, the *Decidua* and that part of it called *Reflexa*, are thickest and strongest, and decrease in thickness towards the other end of the Uterus and Ovum, in proportion as these become more expanded.

The *Decidua* and *Decidua Reflexa* unite into one Membrane in advanced Gestation. They have been supposed to be formed originally by an Efflorescence thrown out upon the parts on which they are placed, in the manner it is thrown out upon inflamed surfaces.

Between the Amnios and Chorion, a *Gelatinous Fluid*

is contained in the early Months, at which period a small *Bag*, filled with a milky-like Fluid, is observed on the Amnios, near the Umbilical Cord, and is termed *Vesicula Umbilicalis*, vel *Alba*. Tab. CIX. Fig. 2.

The *Vesicula Umbilicalis* is connected to the Cord by a Filament consisting of an Artery and Vein, which, with the Fluid and Bag, soon disappear. The use of this Vesicle, which has sometimes been mistaken for an *Allantois*, is not yet understood.

In early Gestation, the Ovum is large in proportion to the Embryo; but towards the latter period of Pregnancy, the proportion is reversed, as appears from the following observations.

No well-authenticated account has been yet received, of the Embryo being observable till near the end of the third Week, when it is found to appear like an oblong Vesicle floating in the Limpid Liquor of the Ovum. Tab. CIX. Fig. 1.

In the fourth Week, the Ovum is about the size of a Pigeon's Egg, and the Embryo not larger than that of a common Fly.

About the end of the third Month, the Ovum is the size of a Goose's Egg, and weighs eight ounces, while the Embryo is between two and three ounces in weight, and three inches in length; and the Head and Extremities being now distinctly observable, it obtains the name of *Fœtus*, which it retains from this time till the end of Gestation.

In the sixth Month, the Placenta and Membranes weigh seven or eight ounces, the Fœtus twelve or thirteen, and is then eight or nine inches in length, and perfect in all its external parts.

At Birth, the Secundines weigh only between one and two pounds, the Fœtus six or seven, and is from eighteen to twenty-two inches in length.

Still, however, from the difficulty of ascertaining when Pregnancy commences,—from the difference of Fœtuses of the same age in different Women, and in the same Woman in different Pregnancies, and—from the Fœtus being frequently retained in the Uterus some time after it is dead, as well as from the inaccuracy of many of the Figures representing these Parts,—the above observations are not altogether to be depended upon.

CHANGES PRODUCED IN THE UTERINE SYSTEM BY IMPREGNATION.

Immediately after Impregnation, a large *Orifice* is constantly observed in the Ovarium, leading to a *Cavity* in that

that part of it from whence the Rudiments of the Fœtus have been derived.

This *Cavity* appears first flocculent, and is afterwards filled up with a Granulous Substance, which has the name of *Corpus Luteum*, from the yellow appearance it assumes, especially in Quadrupeds.

The *Corpus Luteum* consists of an outer Vascular, and an inner Inorganic-looking Substance, which has been considered by some Authors as the remains of the Ovum. Tab. CXI. Fig. 1. B.

The *Corpus Luteum* is not found till after Impregnation. It continues during Pregnancy, and for some time after Delivery, when it gradually vanishes, but leaves a *Scar* in the Ovarium, which continues for life.—The number of *Corpora Lutea* corresponds with that of the Ova impregnated.

After the Embryo is received into the Cavity of the Uterus, the Os Tincæ is shut up by a *Ropy Mucus* secreted from the Follicles in the Cervix Uteri; the Menstrua cease to flow,—and the Uterus by degrees is changed from a triangular to an oval form.

From the Influx of Blood, and the growth of the Ovum, the Cavity of the Uterus gradually enlarges from a size capable only of admitting an Almond, to that which contains the full-grown Fœtus, the Secundines, and Waters; composing together a Mass equal to nine or ten pounds weight.

Some time after Impregnation, the Fundus and Body of the Uterus, being softer and looser than the Cervix, first yield to the parts which it contains.

For the two first Months, the Uterus increases so little as to remain in the Cavity of the Pelvis, and it is generally after the third Month, before the Tumour formed by it can be felt above the Symphysis Pubis.

During the first three Months, the Os Tincæ remains smooth and even, and its Orifice is nearly as in the unimpregnated state; but between the third and fifth Month, the Cervix and Orifice begin to be dilated, the former becoming softer, and the latter changing its common appearance, and projecting more into the Cavity of the Vagina.

The Uterus continues to rise through the whole period of Gestation, but frequently inclines a little to one side.—In the seventh Month, it reaches the Umbilicus, and at last touches the Scrobiculus Cordis, Stomach, and Colon, occupying the whole of the Umbilical and Epigastric Regions.

In the progress of Gestation, the whole Uterus becomes softer, looser, and more Vascular, and the Vessels are greatly enlarged; the proportional increase being nearly similar to that of the Uterus.

The Arteries in their course are remarkably convoluted,—fully as much so as they are previous to Conception,—and greatly more so than the corresponding Veins. Tab. CXX.

The Veins are much larger than the Arteries, their diameters being such as to have distinguished them by the

name of *Sinuses*;—and to them the great bulk of the Uterus is chiefly owing. Tab. CXX.

The Substance of the Uterus was formerly supposed by some to be thicker, and by others to be thinner in the Gravid, than in the unimpregnated state; but it appears now to be sufficiently ascertained, that it is nearly of the same thickness in both states, and during the whole term of Pregnancy.

In the latter Months, the Tubercle of the Os Uteri is considerably enlarged, and the firmness of its Texture converted to the Spongy softness of the Body of the Uterus. The Os Tincæ is changed from a Transverse Slit into an oval Pit; and in Women who have born several Children, it is considerably dilated near the end of Gestation.

The situation of the Appendages of the Uterus is also considerably altered. The Ovaria, with the Tubes and Ligaments of the Uterus, are situated lower, in respect to the Fundus Uteri, in proportion as it ascends, Tab. CXVII.; and at the full time, the broad Ligaments, by assisting in forming a Covering to the Uterus, are nearly obliterated.

In the enlarged state of the Uterus, the *Muscular Fibres* are distinctly seen.—They form Fasciculi which run in various directions, but cannot be traced far without interruption.

A description is given by RUYSCH of a *Circular Muscle* in the bottom of the Uterus, for the Expulsion of the Placenta;—but the Placenta is found to adhere to other parts beside the Fundus Uteri; nor has such a Muscle been observed by later Anatomists.

The Muscular Fibres of the Uterus assist in the Delivery of the Child and Expulsion of the Placenta; and in a few days after Delivery, the Uterus, partly by the contractile power of these Fibres, and partly by that of the Blood-vessels, is restored to near its former dimensions.

CONTENTS OF THE UTERUS ABOUT THE END OF PREGNANCY.

The Contents of the Uterus, towards the end of Pregnancy, consist of the Fœtus, the *Umbilical Cord*, *Placenta*, *Membranes*, and *Waters*.

The Cord, Placenta, and Membranes, are named the *Secundines*, or *After-birth*, with which some include the Waters, though these are discharged previous to the Expulsion of the Child.

The *Cord* is fixed by one end to the Umbilicus of the Fœtus, and by the other it is attached to the Placenta at a little distance from its middle; from which circumstance the extraction of the Placenta is more easily effected. Tab. CX.

It is commonly about two feet long,—in some instances more, in others less;—but in general it is of sufficient length to allow the Birth of the Child, while the Placenta adheres to the Uterus of the Mother.

Its

Its thickness is nearly equal to that of one's Finger, but it is smaller and weaker at the extremity next the Placenta.—It is seldom of a Cylindrical form, being marked with Sulci corresponding to the course of its Vessels.

It is composed of *one Vein* and *two Arteries*, which twist about each other in a spiral direction, and are covered by a smooth Coat derived from the Membranes. Tab. CXXII.

The Trunks of the Vessels are inclosed in a *Gelatinous Cellular Substance*, which adds to the strength and elasticity of the Cord, and allows the Blood to pass freely between the Fœtus and Placenta, without being in danger of interruption from pressure.

The *Vein* is much larger than the Arteries. It is destitute of Valves, and sends off no Branches till it reach the Fœtus.

It arises from the Substance of the Placenta, and, after perforating the Umbilicus, it passes in the inferior part of the Ligamentum Suspensorium, to the under side of the Liver. Tab. CX. Fig. 3.—Tab. CXXII.

The *Arteries* arise from the Iliac Arteries of the Fœtus, perforate the Umbilicus, Tab. CXXII. and run to the Placenta, in the Substance of which they divide into their ultimate Branches. Here the Ramifications of one Artery frequently form large Anastomoses with those of the other, and both communicate with the Branches of the Vein, in the manner Arteries and Veins do in other parts of the Body.

The Cord, by means of the Vein, conveys pure Blood from the Placenta for the nourishment of the Fœtus, and, through the medium of the Arteries, returns what is not used in Nutrition, again to be mixed with the Blood of the Uterus.—By the intervention of the Cord also, the Placenta is more readily extracted.

The *Placenta* is a Spongy Mass, of a round form, occupying near a fourth part of the Ovum. Tab. CXII.

It is about seven or eight inches in breadth, and upwards of one inch in thickness; but is thinner at the edges where the Membranes go off.

The External Surface, or that next the Uterus, is divided into Lobules with deep Fissures, while the Internal, or that next the Fœtus, forms a regular Mass, which has numerous large Branches of the Umbilical Vessels dispersed upon it.

In the Placenta are to be observed,—on the side next the Child,—the Ramifications of the Umbilical Vessels forming the principal part of its substance, Tab. CX.—Tab. CXV.; on the side next the Mother, Branches of the Uterine Arteries, almost of the size of Crow-quills, passing in a convoluted manner between the Uterus and Placenta, and terminating in the latter;—Veins corresponding with these Arteries, but flat and of great size, running obliquely from the Placenta to the Uterus,—and, in the Substance of the Placenta, an appearance which has been supposed by many Authors to be the common Cellular Membrane, of a tender nature, and easily rup-

tured by Injection, but which is considered by late Authors as a regular Spongy Substance, similar to that in the Body of the Penis.

The Placenta is connected to the Uterus on one side by Blood-vessels and by the Decidua, and to the Fœtus on the other, by means of the Umbilical Cord.

The common place of attachment is near the Fundus Uteri; though it is found at different times adhering to all the other parts of the Uterus, not even the Os Tincæ excepted.

In the case of Twins, there is sometimes only one, but most frequently two distinct Placentæ, adhering together by the intervention of a Membrane in which the Vessels of the two Placentæ occasionally communicate with each other.

There are in this case also, two distinct Apartments separated by a Partition; each Apartment containing its own Waters and Cord. Tab. CXIX.

The Placenta receives Blood from the Uterus, and, according to the opinion of modern Anatomists, purifies the Blood, as the Lungs do in the Adult, for the nourishment of the Fœtus.

The *Membranes* consist of the *Spongy Chorion*, the *True Chorion*, and the *Amnios*.

They form a complete but slender Bag, which lines the Cavity of the Uterus, and incloses the Fœtus, Umbilical Cord, and Waters. Tab. CX.—Tab. CXXI. Fig. 1. 2.

The *Spongy Chorion* is a thick opaque Substance, which adheres to the Uterus, and forms the outer Layer of the Ovum, but scarcely penetrates between the Lobules of the Placenta.

Between the Uterus and Placenta, it is less distinct than elsewhere, being perforated there, and in some degree concealed by the Blood-vessels proceeding from the inside of the Uterus.

It has a Spongy and Villous appearance, and is full of small Blood-vessels, which can be readily injected from those of the Uterus.

The *True Chorion* is thinner, smoother, and much denser, than the former, is connected with the Spongy Chorion as far as the edge of the Placenta, where it separates from it, is reflected over the Surface of the Placenta which is opposed to the Fœtus, and is afterwards continued over the whole of the Cord.

It is uniform in its Texture, has a transparent appearance, adheres to the Spongy Chorion and Surface of the Placenta, by a delicate Cellular Substance, and has no Vessels visible to the naked Eye, or which can be injected.

The *Amnios* lines the Surface of the True Chorion, and, with it, is reflected from the Placenta upon the Cord, which it supplies with an External Covering.

It is thinner, more dense, and transparent, than the Chorion, to which it adheres every where by a Jelly.

It is smooth and polished on the side next the Fœtus, and is destitute of Blood-vessels.

The

The Membrane, besides containing the Child and Waters, give origin to the latter, and, in the time of Labour, assist in opening the Orifice of the Uterus.

The *Waters*, called *Liquor Amnii*, are thinnest and clearest in the first Months, after which they acquire some degree of colour and ropiness.

The *Liquor Amnii* is chiefly composed of the Serum of the Blood. In its natural State, it has all the Characters of the Liquor Pericardii, or of the Liquors exhaled from the Surfaces of other Membranes similar to the Pericardium.—It is supposed to be derived from the Exhalent Arteries of the Amnios.

It is proportionally greater in quantity in the first than in the last Months; but the proportion and quantity vary considerably in different Women, and in the same Women in different Pregnancies.

Between the Amnios and Chorion, Water is frequently collected, but in much smaller quantity than in the Amnios, and is termed *False Water*, or *False Delivery*.—It is frequently discharged some time previous to the Birth of the Child, without any danger.

The Liquor Amnii defends the Child and Umbilical Vessels from the pressure of the Uterus, assists in distending the Uterus during Gestation, and allows the Fœtus a certain degree of motion.

In the time of Labour, it also assists in dilating the Mouth of the Uterus, and, by lubricating the Vagina, facilitates Delivery.

PECULIARITIES OF THE FŒTUS.

All the Bones in the Fœtus, excepting a few, are *soft*, *yielding*, and *imperfect*, and many of them entirely in a *state of Cartilage*.

The Head is *large* in proportion to the rest of the Body, and the Bones of the Cranium are united by *Membrane*, which admits of some alteration in the Form of the Head, whereby its Passage is facilitated in the time of Delivery. Tab. XXVII.

Between the Frontal and Parietal Bones, is the Membrane called *Bregma*, formed of a Membranous Substance, which commonly disappears before the Child is two years of age, the margins of the Bones being then united.

—The other Peculiarities of the Bones of the Fœtus are taken notice of along with the Description of the Bones of the Adult.—

In the Fœtus, the Fluids are proportionally *larger*, and the Solids generally *softer* than in the Adult.

The Skin is of a *bright red colour*, in consequence of its greater degree of Vascularity.

That part chiefly of the Cellular Membrane is *Adipose*, which is upon the Surface of the Body; scarcely any Fat being found in the interior parts, where it gradually accumulates as the person grows older.

The Brain, Spinal Marrow, and Nervous System, are proportionally *larger*, but *softer*.

The Sanguiferous System, and Glandular Organs, are *larger*.

The Pupil of the Eye is occupied and completely covered by the *Membrana Pupillaris*, which arises from the inner margin of the Iris. Tab. LXXIV. Fig. 12.

It separates the *Camerae* from each other, and is very Vascular. According to BLUMENBACH, it keeps the Iris expanded during the rapid increase of the Ball of the Eye.

The Crystalline Lens is almost *Spherical*, and has numerous *Vessels* dispersed upon its Capsule. Tab. LXXIV. Fig. 10.

The Meatus Auditorius is wholly *Cartilaginous*, and adheres by its extremity to an imperfect Bony Circle, in which the *Membrana Tympani* is placed. Tab. LXXIX.

The Meatus Externus, and *Membrana Tympani*, are lined by a *Mucous Membrane*, which is cast off after Birth. Tab. LXXIX. Fig. 1.

The Thymus Gland, in the Fœtus, is a *large Substance*, situated in the upper part of the Thorax, between the Layers of the Anterior Mediastinum. Tab. CXXII.

It lies over the Pericardium, and occupies the Space where the Aorta sends off the Carotid and Subclavian Arteries, and extends a short way into the fore-part of the Neck.

It has *two long Cornua* above, and *two broad Lobes* below, is of a pale-red colour, and become afterwards of a darker hue.

A *white serous Liquor* can frequently be squeezed from its substance; but it has no Excretory Duct; nor is the use of the Fluid, or of the Gland itself, yet ascertained.

Some Anatomists are of opinion, that the white Fluid is Chyle sent by a retrograde motion from the Thoracic Duct, and that the Thymus Gland is a Diverticulum to the Chyle when too great a quantity of Lymph is sent to the Subclavian Vein.

In the Adult, the Thymus Gland is so completely absorbed, that scarcely any thing but Cellular Substance remains in its place.

The Blood-vessels of the Thymus are Branches of the Subclavian and Internal Mammary; the Nerves come from the Great Sympathetics and Eighth Pair.

Its Lymphatics have not yet been very accurately traced.

The Lungs are small, firm, and of a dark-red colour, and *sink* when thrown into Water; in consequence of the Bronchial Cells having not yet received Air. But if Air be admitted to them, by Putrefaction or otherwise, they swim in Water, in the same manner as if Air had been conveyed to them in consequence of Respiration.

The Valve of EUSTACHIUS is *distinct* in the Fœtus, but frequently Cribiform in the Adult; is *larger* in proportion, and is supposed to direct the Blood of the Inferior Cava, immediately through the Foramen Ovale to the Left Auricle. Tab. CXXIII. Tab. LXXXIV. Fig. 1. Tab. CXCVIII.

In the back part of the Septum, between the Right and Left Auricles, is the *Foramen Ovale*, nearly equal in size to the Mouth of the Inferior Cava, bounded by a thick Muscular Edge, termed *Annulus Foraminis Ovalis*. Tab. CXXIII. A. Tab. CXXIV. Fig. 2. Tab. CXXI. Fig. 8. 9.

Upon the left side of the Foramen Ovale, a *Membranous Valve* is placed, which allows part of the Blood of the Right Auricle to pass through the Foramen Ovale immediately to the left one, but which completely prevents its return.

The Blood going through the Foramen Ovale, assists in keeping up the balance of circulation between the two sides of the Heart, till the Lungs be ready to receive it.

The Pulmonary Artery divides into three Branches, the right and left of which run to the Lungs, while the middle one, called *Ductus Arteriosus*, larger than both the other Branches, and its Area nearly equal to that of the Foramen Ovale, passes in an oblique direction to the beginning of the descending Aorta. Tab. CXXIII. CXXIIIA. CXXIV.

The Ductus, or Canalis Arteriosus, forms nearly one half of the Aorta, carries part of the Blood of the Right Ventricle into that Artery, without allowing it to pass to the Lungs; and the Aorta, formed in this manner, receives the force of both Ventricles, by which it is more enabled to send blood through the Umbilical Arteries to the Placenta.

The Stomach is of a *rounder* form than in the Adult, and commonly contains a small quantity of a *Gelatinous Matter*.

The Appendix Vermiformis is *larger* in proportion, and is inserted into the extremity of the Colon, which, at this time, does not project to form a proper Cæcum. Tab. CXXI. Fig. 5.

The Colon, and frequently also the end of the Ilium, are filled with a *greenish-black Fæces*, of a viscid consistence, termed *Meconium*.

The Liver is *so large* as to occupy both Hypochondriac Regions. Tab. CXXII.

The *Umbilical Vein* passes from the Umbilicus, in a Duplicature of the Peritoneum, to the left Branch of the Vena Portæ, and carries the Blood from the Placenta to the Liver. Tab. CXXIII.

From the Trunk of the Umbilical Vein, where it terminates in the Liver, a Branch, called *Ductus vel Canalis Venosus*, runs in a somewhat waving direction, and joins the Left Vena Hepatica, where that Vein enters the Cava. Tab. CXXIII. CXXIV.

The Ductus Venosus is much smaller than the Trunk of the Umbilical Vein, and carries part of the Blood of that Vein directly to the Heart, without allowing it to enter the Circulation in the Liver.

The Umbilical Vein sends Branches to the Right Lobe of the Liver, but is principally distributed through the Left Lobe; while the Right Branch of the Vena Portæ carries the Blood of the Splenic and Mesenteric Arteries to the Right Lobe of the Liver. Tab. CXXIII.

After Birth, the Left Lobe of the Liver, which was formerly more particularly supplied by the Umbilical Vein, receives an additional proportion of Blood from the Vena Portarum.

The reason why the Umbilical Vein goes partly to the Cava, and not entirely to the Heart, is not understood.

The Kidneys are irregular on their Surface, being formed of *Lobes*, each of which consists of a Cortical, a Medullary part, and a Papilla, and is covered by a Proper Membrane. Tab. CXXIII. Tab. XCVI.

The Glandula Renalis is almost *as large* as the Kidney, but afterwards rather diminishes than increases in size. Tab. CXXIII. Tab. XCVI.

The Bladder of Urine is of a *long* form, and extends almost to the Umbilicus. The greater part of it is above the Pelvis, and is more particularly covered by the Peritoneum than in the Adult. Tab. CXXI. CXXIII.

The Urachus, which is of a *Conical form*, ascends from the bottom of the Bladder, between the Umbilical Arteries, and between the Peritoneum and Line Alba, to the Umbilicus, and vanishes by degrees in the Umbilical Cord. Tab. CXXI. Tab. CXXIII.

It is formed by a Production of the Fundus Vesicæ, and in the Human Body is generally solid, forming a Suspensory Ligament of the Bladder.

It has been sometimes found hollow at its beginning, and has been said to be so, in one or two instances, throughout its whole length.

In the Fœtal Quadruped, it is a large Tube, which transmits Urine from the Bladder to a Bag between the Amnios and Chorion, called *Allantois*.

The common Iliac Arteries divide, on each side, into a *small* External, and *large* Internal Branch.

The principal part of the Internal Iliacs is occupied in forming the *Umbilical Arteries*, which mount by the sides of the Bladder, on the outside of the Peritoneum, and perforate the Umbilicus in their progress to the Umbilical Cord. Tab. CXXI. Tab. CXXIII.

Soon after Delivery, the Foramen Ovale, Ductus Arteriosus, and Venosus, with the Umbilical Vein and Arteries, begin to contract, and are, in general, completely closed, and the Vessels shrivelled into Ligaments within a year after Birth.

This Obliteration is produced by a Contractile power in the parts, by a pressure in the surrounding Viscera, and by the Blood being directed through other channels.

The Pelvis of the Fœtus is commonly *so small*, that the principal parts of its Viscera are contained in the open Cavity of the Abdomen.

The Prepuce of the Clitoris is proportionally *so much larger* in a young Fœtus than it is afterwards, that, in an Absorption, a Female Fœtus has been frequently mistaken for a Male.

The Testes are lodged, during the greater part of Gestation, in the Cavity of the Abdomen, over the Psoæ Muscles, and a little below the Kidneys. Tab. CXXIV. CXXV.

They constitute a part of the Abdominal Viscera, and, in a similar manner with them, are connected to the Body by a Production of the Peritoneum, which forms their Tunica Albuginea.

Between the Testicle and Scrotum, a Fibrous and Vascular Substance, of a Conical form, is extended,—called by Mr HUNTER, *Gubernaculum*, vel *Ligamentum Testis*, which he considers as a principal agent in directing the course of the Testicle, and in making way for it in its descent. Tab. CXXIV. CXXV.

About the eighth Month of Pregnancy, the Testis, by means not yet completely ascertained, passes gradually along to the Scrotum, a Process of the Peritoneum preceding it, which afterwards forms its Vaginal Coat.

The Testis, through the whole of its course, continues to be covered by the Peritoneum, is connected to the parts on which it rests, and has its Vessels passing to it from behind forwards, the same as when situated in the Abdomen.

While the Testicle is passing through the Ring of the Abdominal Muscle, the Ligamentum Testis is found to be in some measure inverted, and to form the under and fore part of the Vaginal Coat, on which the Cremaster is expanded.

After the descent of the Testicle, the Peritoneal Process, which descends along with it, begins to contract at the Ring, and a firm adhesion of its sides, to within a little distance of the Testicle, is commonly found to be produced by the time of Birth.

POSITION OF THE FŒTUS.

In the first Months, the Embryo swims in the Liquor Amnii, free from the pressure of the surrounding parts;—and from many Dissections and Observations made by the latest Anatomists, it is ascertained,—that the Head preponderates, and in general continues undermost till the Child is delivered.

Formerly it was supposed, that the Embryo, in the first Months, was situated with the Head uppermost, and that, in the latter Months, the attitude of the Fœtus was inverted.

The Fœtus is observed to be coiled up into as round a figure as possible, so as to be properly adapted to the Cavity of the Uterus. Tab. CX. CXI. CXIV.

The Head is bent towards the Thorax, and the Arms are folded:—The Knees are drawn towards the Abdomen, and the Heels towards the Nates.

The Spine is bent into an Arch, and one side of the Body of the Fœtus is frequently turned forwards.

The Head is placed diagonally with its long Diameter corresponding to that of the Pelvis, and the Occiput opposed to the Os Tincæ.

CIRCULATION OF THE BLOOD IN THE FŒTUS.

The Blood is sent by the Arteries of the Uterus to the Substance of the Placenta, from which, according to most of the ancient Anatomists, it passes to the Umbilical Vein by a direct communication of Branches; or, according to the opinion of the greater part of modern Anatomists,—by Absorption.

By the Umbilical Vein, it goes principally to be circulated in the Liver, and by the Ductus Venosus, a small portion of it goes to the Right Auricle of the Heart.

The Blood sent from the Inferior Cava is transmitted by the Foramen Ovale to the Left Auricle, and that sent by the Superior Cava is transmitted to the Right Auricle and Ventricle, and from thence to the Pulmonary Artery.

From the Pulmonary Artery one portion of it passes through the Circulation of the Lungs, and another goes by the Ductus Arteriosus to the Aorta Descendens.

From the Lungs it is returned by the Pulmonary Veins to the Left Auricle, where it mixes with that coming from the Right Auricle by the Foramen Ovale, and is sent by the Aorta to the different parts of the Body.

From the Iliac Arteries, it is conveyed by the Umbilical Branches to the Substance of the Placenta, where one portion of it returns by corresponding Veins to the Fœtus, the rest going to the Uterus in the manner it was discharged from the Uterine Arteries to the Branches of the Umbilical Vein.

TABLE

FIG. 1.

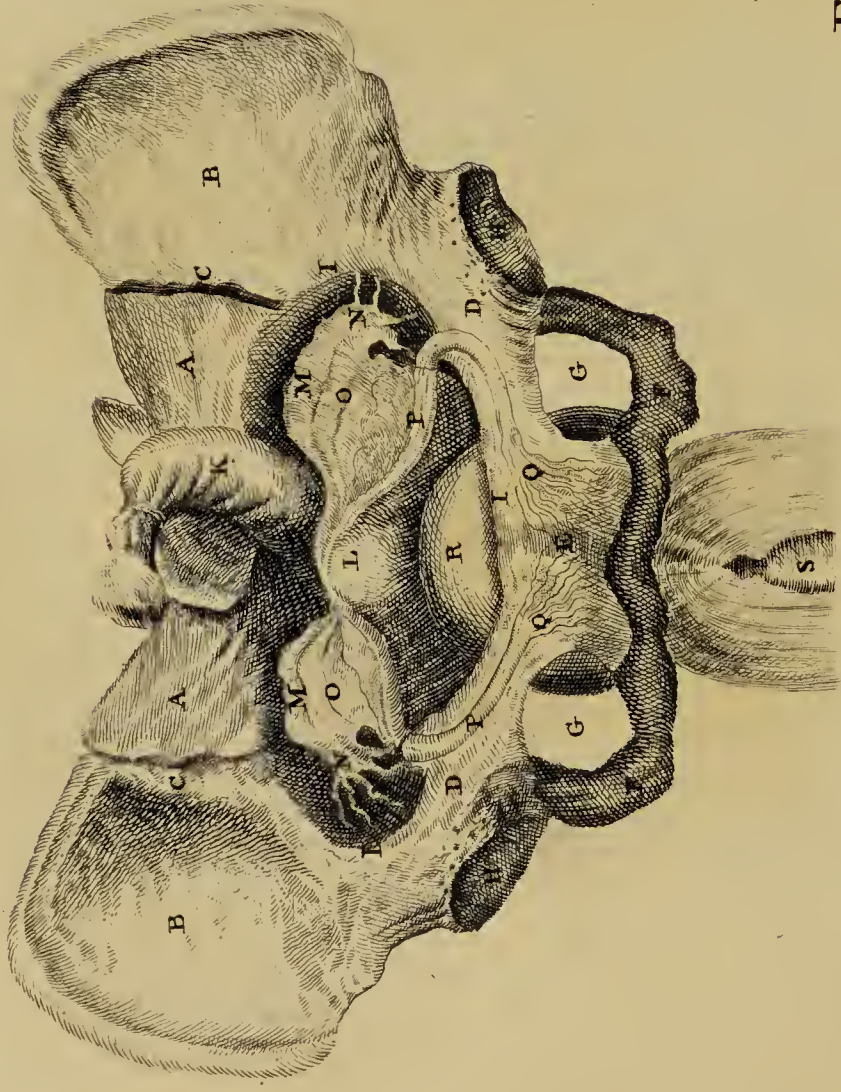


FIG. 2.

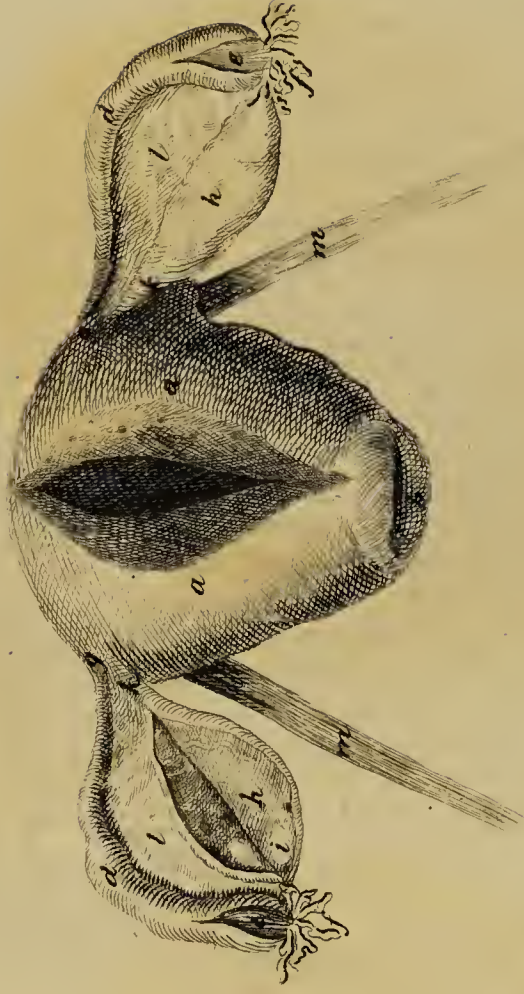


FIG. 5.



FIG. 3.

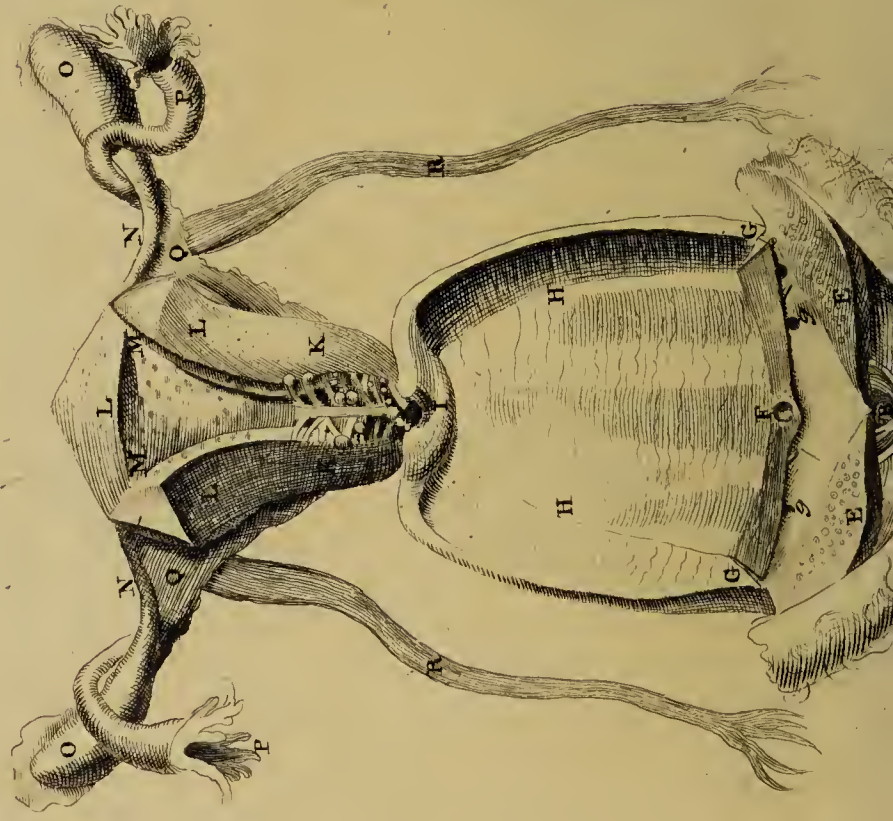
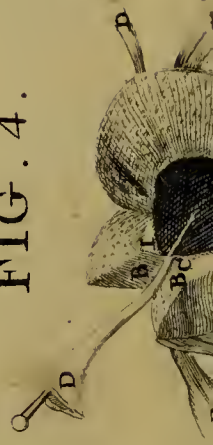


FIG. 6.



FIG. 4.



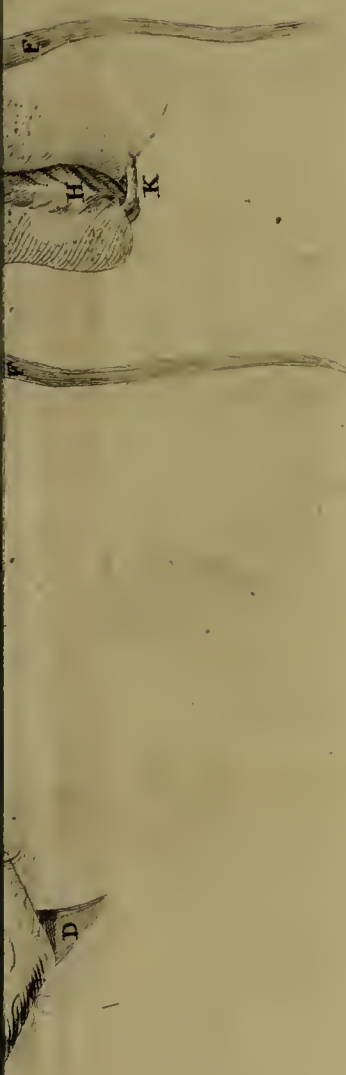


FIG. 7.



FIG. 9.



FIG. 11.

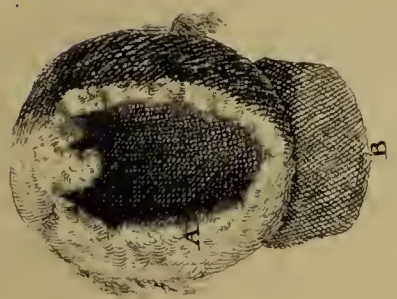


FIG. 13.

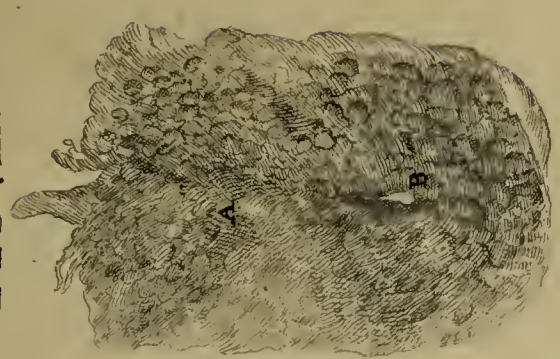


FIG. 15.



FIG. 17.

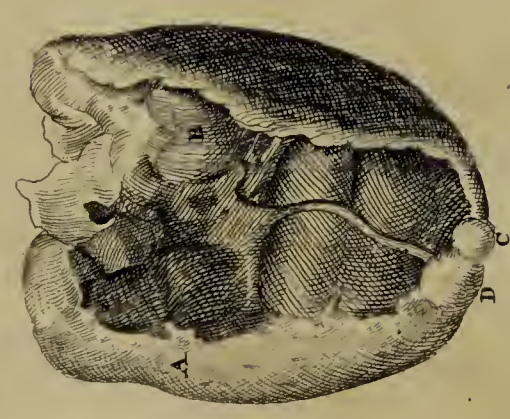


FIG. 19.



FIG. 21.

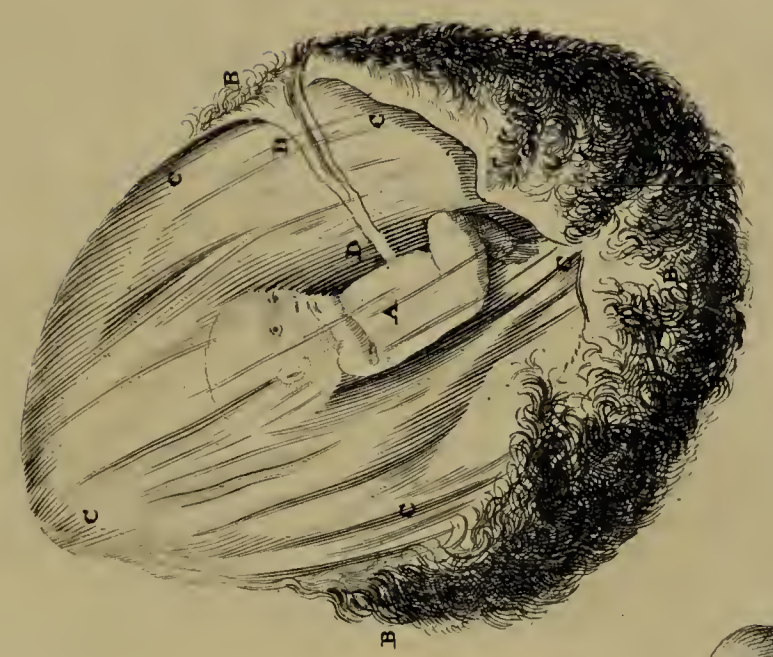


FIG. 23.



FIG. 25.



T A B L E CVII.

VIEWS of the FEMALE PARTS of GENERATION, and of the Fœtus in EMBRYO.

FIG. 1.

A View of the FEMALE PARTS of GENERATION in situ.

- A, A, The upper part of the os sacrum.
 B, B, The ossa ilia.
 C, C, Their connection with the os sacrum.
 D, D, The ossa pubis.
 E, The symphysis of the ossa pubis.
 F, F, The tuberosities of the ossa ischia.
 G, G, The foramina thyroidea.
 H, H, The acetabula for the articulation of the thigh-bones.
 I, I, The brim of the pelvis.
 K, The intestinum rectum.
 L, The uterus.
 M, M, The Fallopian tubes.
 N, N, The fimbriæ of these tubes.
 O, O, The ovaria, concealed by the ligamenta lata of the uterus.
 P, P, The ligamenta rotunda uteri.
 Q, Q, The insertion of the round ligaments into the pubes.
 R, The upper part of the bladder of urine.
 S, The vagina.

FIG. 2.

A View of the Uterus a few days Pregnant.
Explained Tab. CII. Fig. 1.

FIG. 3.

*A View of the FEMALE PARTS of GENERATION, the
 UTERUS and VAGINA being laid open Posteriorly.*

- A, A, The labia pudendi separated and turned downwards.
 B, The glans clitoridis;
 C, Its prepuce.
 D, The superior part of the ligamentum suspensorium clitoridis.
 E, E, The nymphæ, with their sebaceous glands.
 F, The meatus urinarius, near which are situated the orifices of the mucous follicles, or lacunæ, which belong to the glandular body with which the urethra is surrounded.

G, G, The hymen.

g, g, The extremities of the ducts of the lacunæ, which are placed before the hymen.

H, H, The vagina, with its rugæ.

I, The os tinæ.

K, K, The neck of the uterus, with its mucous follicles and rugæ.

L, L, L, The body and fundus of the uterus, in which are spots, such as MORGAGNI observed in a Virgin who was killed, during her menstrual period, by a blow on the head.

M, M, The extremities of the Fallopian tubes, by which they open into the superior angles of the uterus.

N, N, The ligaments of the ovaria, by which these parts of the tubes next the uterus are covered in this Figure.

O, O, The testes, or ovaria.

P, P, The tubes delineated in that position in which the Author of this Figure most frequently found them.

Q, Q, Small portions of the ligamenta lata.

R, R, The ligamenta rotunda.

FIG. 4.

*The UTERUS, dissected in such a manner as to shew the
 Passage of the TUBES into its CAVITY.*

A, A, A longitudinal section of the uterus.

B, B, The fundus of the uterus divided, to shew the entrance of the tubes into its cavity.

C, The origin of one of the tubes.

D, D, The progress of the tubes gradually dilating.

E, E, The ligaments of the ovaria.

F, F, The ligamenta uteri rotunda.

G, The cavity of the uterus.

H, ————— cervix, and its fibrous substance.

I, I, The proper membrane of the uterus.

K, The mouth of the uterus.

L, The contraction of the cervix uteri.

FIG. 5.

*Shews the OVARIUM, with the annexed Extremity of the
 FALLOPIAN TUBE.*

a, The ovarium, opened longitudinally in the under part.
 b, b, &c. Ova of different magnitudes, contained in the membranous substance of the ovarium.

c, c, Numerous.

- c, c*, Numerous blood-vessels going to the ova.
d, The ligament of the ovarium.
e, A section of the Fallopian tube.
f, The cavity of the tube.
g, The orifice in the extremity of the tube.
h, h, The foliaceous part of the tube, attached to the ovarium.

FIG. 6.

A View of the UTERUS, some months Pregnant, to shew its Proportional Size with respect to the PELVIS, and the height to which it rises above the PUBIS.

- A, The uterus.
 B, B, The uterine tubes.
 C, C, The ligamenta lata.
 D, D, ————— rotunda.
 E, The bladder of urine.

FIG. 7.

Ova of different sizes.

FIG. 8.

An OVUM Fecundated, excluded from the UTERUS entire.

- A, The rudiment of the membranes.
 B, ————— blood-vessels forming the elements of the placenta.

FIG. 9.

A Fecundated OVUM, of nearly the same size with that of Fig. 8. opened: No SOLID SUBSTANCE was found in its Cavity.

- A, The outer vascular part of the ovum;
 B, Its cavity.

FIG. 10.

The Rudiment of a PLACENTA of the Minutest HUMAN EMBRYO.

- A, The crude element of the vessels.
 B, Coagulated blood adhering firmly to this crudity.

FIG. 11.

The Rudiment of the PLACENTA, to which the EMBRYO adheres by means of the UMBILICAL CORD.

- A, The rudiment of the placenta.
 B, ————— embryo.

FIG. 12.

Shews the HUMAN EMBRYO of the Size of a Grain of Barley, adhering to the RUDIMENT of the PLACENTA by means of the UMBILICAL CORD.

- A, The head of the embryo.
 B, The body, not yet furnished with extremities.
 C, The umbilical cord.
 D, The rudiment of the placenta.

FIG. 13.

Shewing the HUMAN EMBRYO, somewhat larger than the preceding, the HEAD of which is already distinct from the BODY, and the beginning of the EXTREMITIES observed in the form of very small Tuberosities.

- A, The outer surface of the rudiment of the placenta;
 B, Its inner surface.
 C, The head of the embryo.
 D, The body.

FIG. 14.

Represents the Embryo, still larger than the former, the Head of which is not only distinguishable from the Body, but the Rudiments of the Extremities also appear like large Tubercles; and, which is particularly to be noticed, the Umbilical Cord is nearly equal in thickness to the Embryo itself, which the Author of the Figure reports he has seen oftener than once.

FIG. 15.

Represents an ABORTIVE FœTUS of the Third Month, inclosed within its Membranes, as in an Egg, and floating in its own Liquor.

- A, The fœtus, with a large head and prominent eyes, as is generally the case in this state, appearing through the transparent liquor and membranes.
 B, B, B, B, The exterior layers of the chorion, full of vessels depending like small roots, which the Author of this Figure supposes were first delineated by him.
 C, C, C, C, The transparent coats of the fœtus, from which the vascular part has been separated, to shew the fœtus surrounded by its fluid.
 D, D, The umbilical cord.

FIG. 16.

A Fœtus, with a remarkable thick Umbilical Cord.

FIG. 17.

A Fœtus somewhat larger than the preceding. In this Fœtus, both the Fingers and Toes are visible, and the Umbilical Cord is much thinner than in some of the other Figures.

FIG. 18.

A Fœtus hanging by a Hair; it is larger than the former, but the Umbilical Cord very little thicker.

Fig. 1.



Fig. 3.

Fig. 2.

T A B L E C V I I I .

VIEWS of the GRAVID UTERUS.

FIG. 1.

Represents the Fœtus in UTERO in the Fourth or Fifth Month;—the Fore-part of the UTERUS being cut off.

A, A, A section of the ossa innominata, as in Tab. C.

B, B, A section of the uterus.

C, The fœtus, with the head turned towards the under part of the pelvis.

E, E, The umbilical cord.

F, The placenta,—the side next the fœtus covered by the chorion and amnios.

G, G, The membranes adhering to the uterus.

g, g, g, g, The edges of the membranes somewhat detached from the surface of the uterus.

H, The cervix uteri, from which the bladder has been dissected, shortened.

I, The os internum uteri.

K, K, The ligamenta lata.

L, L, A section of the vagina.

M, M, Cellular substance.

N, N, The integuments of the nates.

O, The anus.

FIG. 2.

A View of the Gravid Uterus in the Second Month, cut in a similar way with that represented in Fig. 1.—In this are to be seen, the Fœtus, the Umbilical Cord and its Branches, with the surrounding Membranes.—The Cervix Uteri is still of its natural length.

FIG. 3.

A similar View to the former, also in the Second Month, but the Parts more evolved, and the Cervix Uteri considerably shortened.

TABLE

T A B L E C I X.

Exhibits FIGURES of the HUMAN FœTUS at different Periods.

FIG. 1.

Shows an ABORTIVE OVULUM in the Third or Fourth Week after Impregnation, containing a very small EMBRYO.

The ovulum is completely covered with tomentum, which is formed of fibres proportionally long, and thick, though upon about a third or fourth part of the ovulum they were found shorter and thinner. Among the fibres, little knots are every where interspersed, which are considered as belonging to the placenta. The ovulum was filled with a pure fluid, and contained a very small curved embryo, closely connected to it by a short umbilical cord. From the body, upper and under limbs project, in the form of tubercles.

FIG. 2.

An ABORTIVE OVULUM, about Six Weeks after Impregnation.

The filaments covering this are proportionally shorter and thinner than upon the former one, and without knots. The vesicula is of an oval form, and contained a clear fluid, apparently collected from the chorion and amnios. The chorion was found much thicker and harder than the amnios. The embryo adheres to the ovulum by a very short and thick umbilical cord; and is so much bent, that the tuber coccygeum almost touches the head. The size of the head almost equals the rest of the body, without any appearance of either eyes or mouth. The limbs are in form of globular tubercles, the lower limbs separated by the tuber coccygeum. From the middle of the body, the substance termed *vesicula umbilicalis* arises, by a small filament, and is situated between the amnios and chorion.

FIG. 3.

An EMBRYO, supposed to have completed the Sixth Week.

The eyes and mouth are distinct, but no mark of a nose. The extremities are more distinct than in the preceding embryo. The thick umbilical cord is now longer.

FIG. 4.

An EMBRYO about Seven Weeks, adhering by the Umbilical Cord to its Ovulum.

The ovulum does not exceed that of the second Figure in size. The flocculi of the membrana decidua are fewer and shorter than in the second ovulum. The embryo immersed in the fluid of the amnios is bent, and larger than the preceding. In the eye the iris is distinguished by its blackness. Poruli mark the place of the nose. The aperture of the mouth is wide. In the upper limbs, the arm and fore-arm can be distinguished. Between the lower limbs, which are less conspicuous than the upper, the tuber coccygeum projects. The umbilical cord is longer, but more slender. The funnel-shaped process of the amnios is distinct round the cord. The sex not yet to be distinguished.

FIG. 5.

An EMBRYO of full Seven Weeks, contained in an Ovulum of uncommon size.

The body of the embryo is curved, the eyes, mouth, and nostrils are distinct, but the openings of the ears can scarcely be seen without the assistance of a glass. The abdomen, turgid and prominent towards the umbilicus, ends in the umbilical cord. In the superior extremities, though short, their different parts can be readily distinguished. The lower limbs now extend beyond the tuber coccygeum, but there are yet no appearance of toes. This embryo is supposed to be of the female sex, from two small holes seen in the lower part of the trunk.

FIG. 6.

A Female EMBRYO, about Eight Weeks.

The projections of the nose and ear now begin to be visible; the limbs extend beyond the trunk, the toes appear distinct; the umbilical cord becomes longer and smaller.

FIG. 7.

A Female EMBRYO about Nine Weeks.

The parts seen in the former figure become here more evident. The tuber coccygeum disappears.

FIG.

Fig. 1.

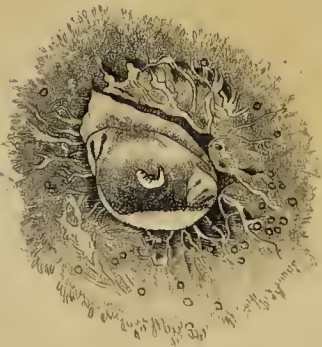


Fig. 2.

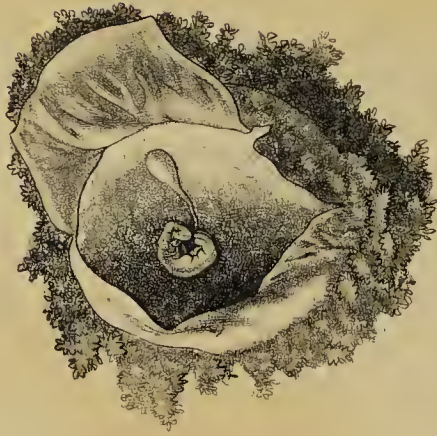


Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.

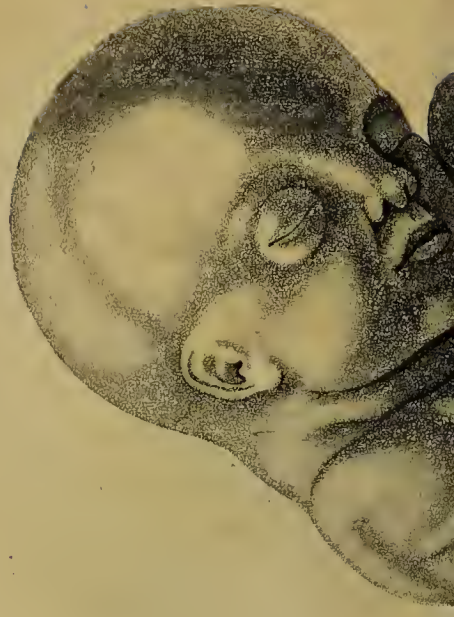




Fig. 15.



Fig. 16.



Fig. 17.



FIG. 8.

A Female EMBRYO about Ten Weeks.

The palpebræ now appears, the mouth is almost shut, and the nose projects; the external parts of the body, in general, bear all the marks of the sex.

FIG. 9.

A Male EMBRYO, considered to be Eleven Weeks complete.

The prominences of the nose and ears become now more perfect; the palpebræ are shut.

FIG. 10.

A Male FœTUS, supposed to be Twelve Weeks complete.

In this, bones appear in the head, trunk, and extremities; and the nails were observed in the fingers and toes. Scarcely any of the tuber coccygeum remains; the penis projects, the scrotum is empty.

FIG. 11.

A Male FœTUS, perhaps exceeding Three Months.

FIG. 12.

A Male FœTUS which has nearly reached the Fourth Month.

The external parts of generation are distinct. The superior extremities are almost of the same length with the inferior.

FIG. 13.

A Female FœTUS in the middle of the Fourth Month; more advanced and fuller than the preceding.

FIG. 14.

A Female FœTUS exceeding Four Months; much farther advanced than the former.

FIG. 15.

A Male FœTUS which appears to be Four Months.

FIG. 16.

A Male FœTUS of Four Months.

The countenance and thorax in some measure indicating the sex; the penis is somewhat thick, the scrotum is empty.

FIG. 17.

A Beautiful Well-formed Female FœTUS of Four Months and a half.

The integuments have acquired a proper quantity of fat, the countenance is pleasant, the trunk and limbs well proportioned, the head regular, and a little oval, the fore-head round, the eyes large; the round arms, the hands and fingers, those of a female; the inferior extremities exceeding the superior in size.

T A B L E CX.

FIG. 1.

The HUMAN OVUM of five Months discharged entire from the UTERUS, in consequence of the Woman having been kicked upon the Belly.

In describing the ovum, the situation is here chosen, in which the most of its parts, without changing their place, might appear through the pellucid membranes. The half of the surface of the ovum appears, which belonged to the inner and left side, while it remained *in utero*; from which it is to be observed, that the head of the foetus occupies the lowest part of the uterus; that it is turned towards the left and back part of the pelvis; and that the ovum has the form of the hollow pregnant womb, to which it clings. The liquor is less in proportion to the size of the foetus than in early gestation, but sufficient to keep the ovum equally distended, and of the oval form.

The surface of the ovum is every where covered with a filamentous substance, which, however, is more abundant and shaggy where the Placenta is formed, as is seen at the upper and left side.

FIG. 2.

Shews the three MEMBRANES of which the OVUM is com-

posed. The SPONGY CHORION is seen on the Outside, the TRUE CHORION in the Middle, and the AMNIOS, which is left entire, is observed on the Inside. The Branching of the UMBILICAL VESSELS is sufficiently distinct.

FIG. 3.

The Foetus, which in Fig. 1. and 2. appeared through the membranes of the ovum, is here removed from the amnios, but the extremities are left in their natural situation. The umbilical cord is a little unfolded, and the placenta so placed, as to shew its inner surface. The Foetus is so disposed, as to correspond not only with the other two figures of this, but with all the other figures of the former table. The twisting of the umbilical cord is here observed, its insertion, not to the middle, but towards the edge of the placenta, where the covering of the cord is continued, to form the two inner membranes of the ovum. The umbilical arteries are seen dividing into branches, and the veins uniting to form a trunk. The placenta appears of an oval form; at one edge the membranes are turned back, to shew the spongy-like and vascular nature of this substance; and in a small portion, the minute vessels of which it is composed are shewn by maceration.

TAB. 110.

Fig. 1.

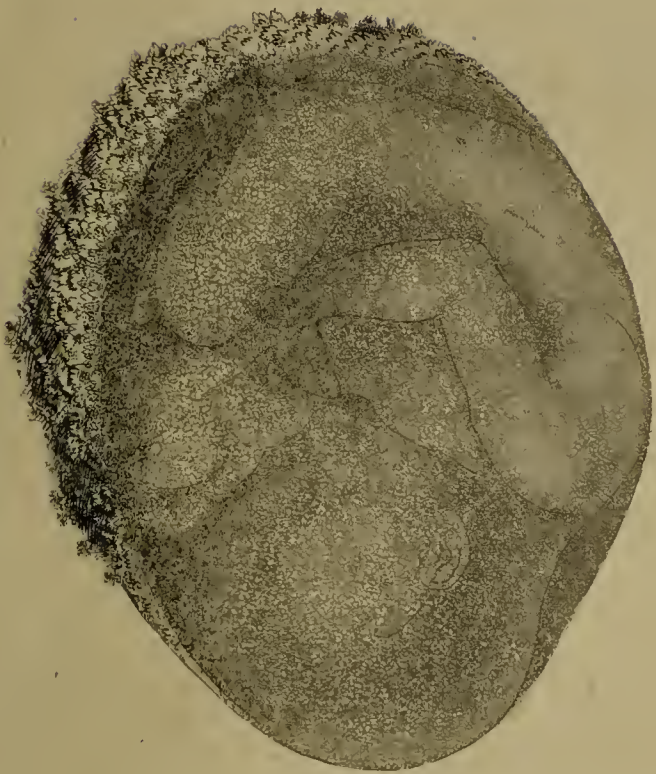


Fig. 2.

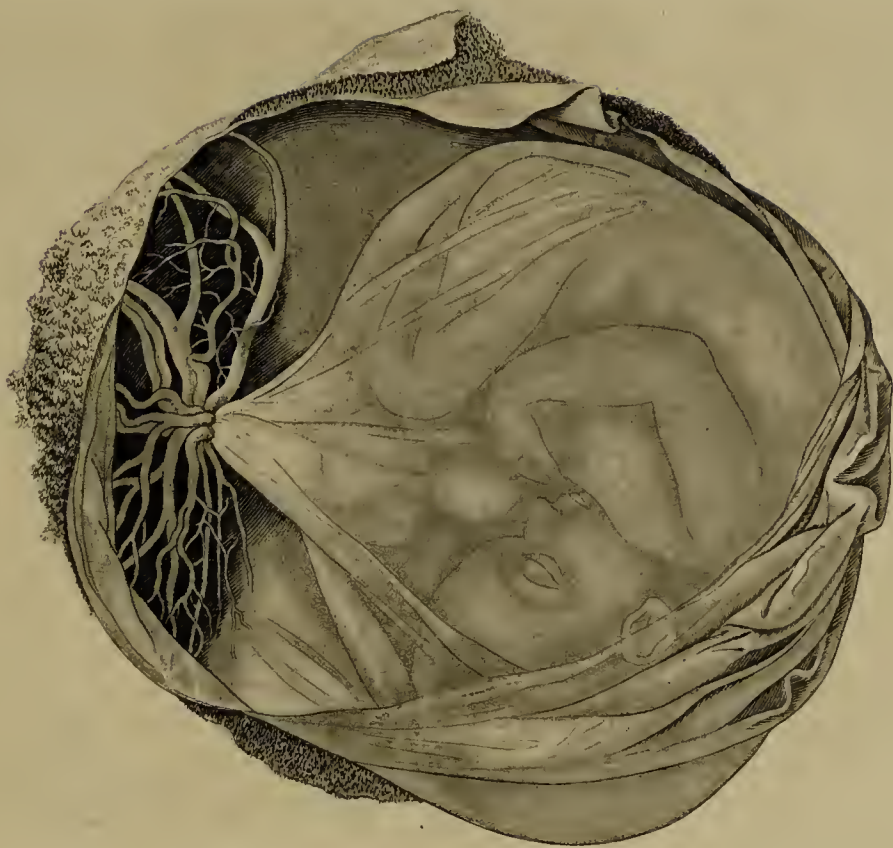
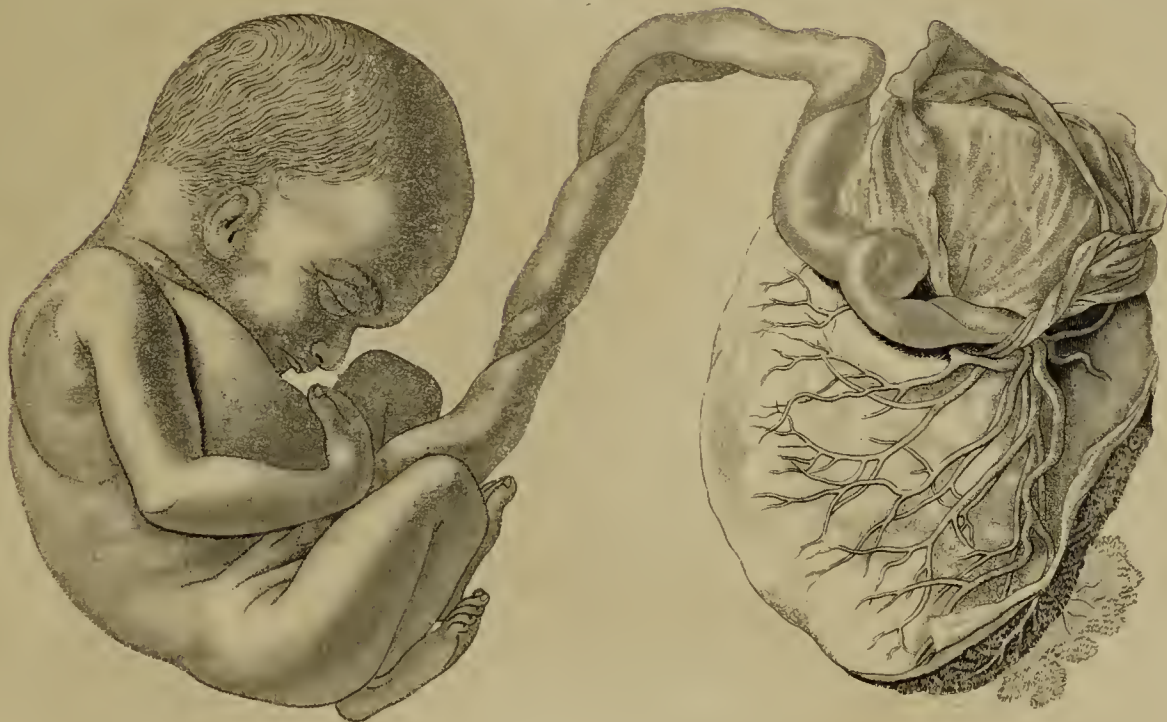


Fig. 3.



Aqua-tinted by A. Fyfe.



Fig. 1.



Fig. 4.

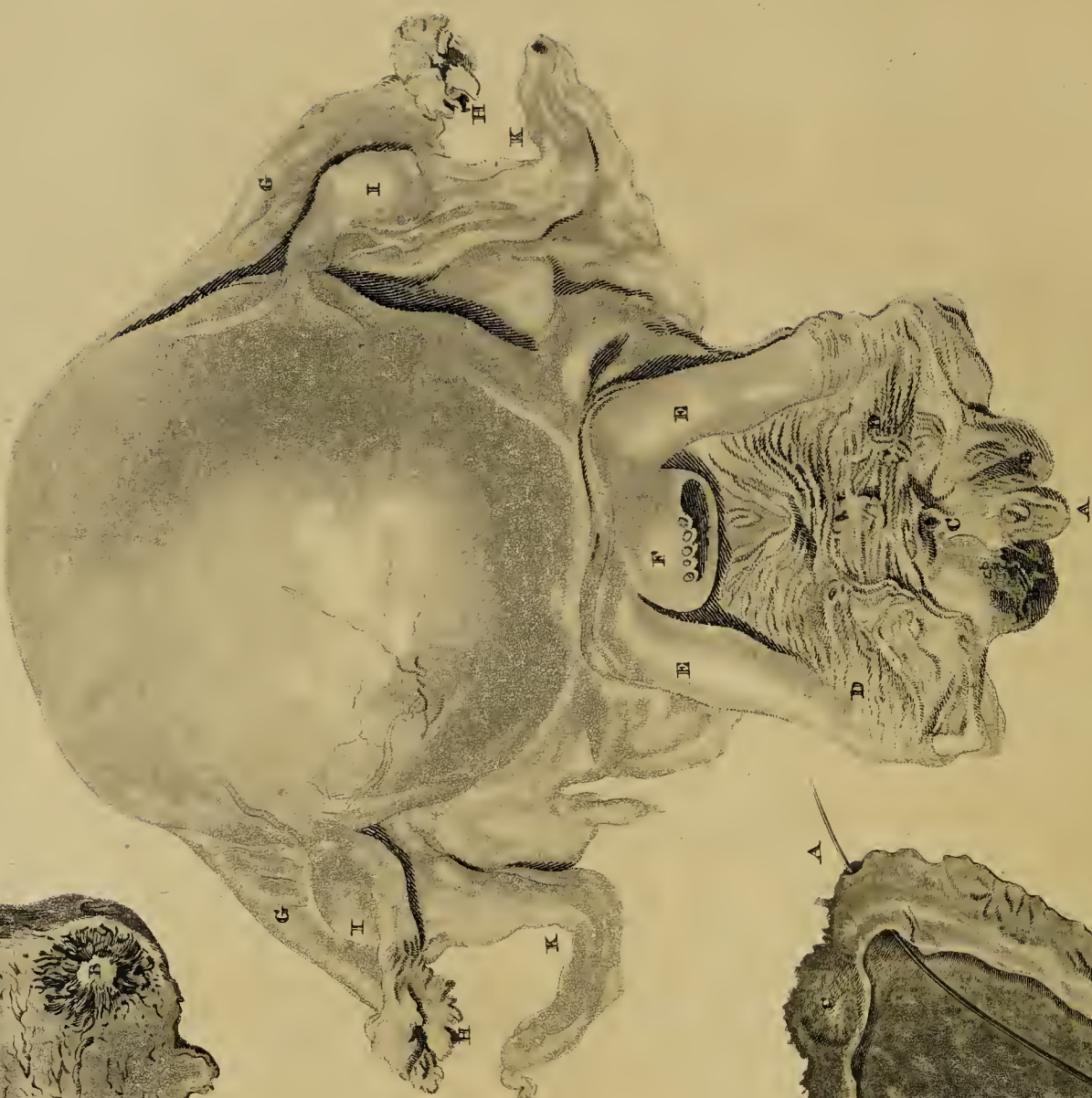


Fig. 3.



Fig. 2.

T A B L E CXI.

FIG. 1.

The RIGHT OVARIUM at the full time, cut open, to shew the CORPUS LUTEUM.

- A, A, The substance of the ovarium, with numerous serpentine arteries interspersed.
 B, B, The corpus luteum. No vessels appear in its centre, which is of a white colour; but all around the centre, its substance is very vascular.

FIG. 2.

An OVUM of about three Weeks, covered with the TUNICA FILAMENTOSA cut open.

- A, A, A bristle passed into the cavity of the ovum, through a hole at each of the upper angles, which was supposed to be the termination of the FALLOPIAN tube.
 B, B, The same bristles coming out through a larger hole at the lower angle, supposed to be opposite to the cervix uteri.
 C, A small hydatid projecting through the substance of the decidua, which had slender branching filaments shooting from the surface supposed to be the chorion.

FIG. 3. & 4.

From a Subject in the beginning of the Fifth Month of Pregnancy. The ARTERIES and VEINS were injected with Wax of different Colours.

FIG. 3.

A Back View of the UTERUS, with the VAGINA laid open, to shew the state of the CERVIX and OS UTERI.

- A, The clitoris.
 B, B, The nymphæ.
 C, The orifice of the urethra.
 D, D, The lower end of the vagina, which is rugous.
 E, E, The upper end, which is more smooth, especially behind.
 F, The orifice of the uterus, projecting into the upper end of the vagina.
 G, G, The tubes.
 H, H, The fimbriæ.
 I, I, The ovaria.
 K, K, The bundle of spermatic vessels passing up in the ligamenta lata to the ovaria, tubes, and fundus uteri.

FIG. 4.

The same UTERUS fully opened, shewing the DECIDUA REFLEXA upon the CHORION, through which the CHILD appears; and the Inside of the CERVIX and Orifice of the UTERUS.

- A—K, of Fig. 3. are little more than outlines in this figure.
 L, The rugous inside of the cervix uteri, seen through the transparent membranes.
 M, M, The substance of the uterus and of the decidua cut through.
 N, N, The decidua reflexa covering the transparent membranes in white and opaque striæ. It was become so thin, by extension, as to be rendered almost transparent in many places. It had not as yet contracted an adhesion with the decidua which covered it.

T A B L E CXII.

FIG. 1.

From a Subject in the Fifth Month. The UTERUS fully opened, and the Fœtus taken out, to shew the exact Dimensions and Proportions of the CHILD, and the State of the CERVIX UTERI at this Period of UTERO-GESTATION.

- A, A, The opening made in the membranes for the extraction of the child, through which is seen the inside of the placenta around the termination of the umbilical cord.
- B, B, The collapsed amnios and chorion, covered externally with the decidua reflexa, which had not as yet contracted an adhesion to the decidua.
- C, C, The uterine tubes.
- D, D, The broad ligaments.
- E, The decidua, lining that part of the uterus where the placenta did not adhere to it.
- F, F, F, F. The section, from side to side, of the substance of the cervix uteri.
- G, The upper, narrower, and smaller part of the passage in the cervix uteri, where the decidua was evidently continued down into the inner membrane of that passage.
- H, The lower, wider, and rugous part of that passage.
- I, The inside of the posterior lip of the os uteri, studded with small bags of jelly.
- K, The inside of the adjacent parts of the vagina.
- L, L, The two small pieces of floating membranes represent, though very imperfectly, two portions of the cuticular lining of the vagina, which, in this subject, was separated distinctly, as far up as the projection of the os uteri.

FIG. 2.

From a Subject at Six Months. A Fore-View of the UTERUS, which was injected; the Anterior Part, both of the UTERUS and of the MEMBRANES, having been cut away, and the LIQUOR AMNII taken out, to shew the Fœtus, with part of the PLACENTA and of the UMBILICAL CORD.

- A, The bladder, in its situation with respect to the uterus. It is moderately distended, and is covered with some large branches of the hypogastric veins.
- B, The inside of the posterior part of the vagina.
- C, C, The hypogastric vessels, going into the neck of the uterus, and sending branches to the bladder and vagina.
- D, D, The spermatic vessels, going into the duplicature of the ligamenta lata.
- E, E, The uterine tubes.
- F, F, The fimbriæ.
- G, G, The posterior lamella of the ligamenta lata. The anterior had been removed by dissection, to give a clearer view of the spermatic vessels.
- H, H, The ligamenta rotunda. In the left is seen a large convoluted artery, descending from the spermatic.
- I, I, I, The section of the whole substance of the uterus, and of the membranes, by which the fore-part of the uterus, and of the secundines, was removed, to expose their contents.
- K, The umbilical cord, near its termination in the placenta.
- The placenta adhered to the posterior part, and near the fundus of the uterus. The cord passed first downwards over the shoulder, and then upwards behind the body of the child, to its termination at the placenta.

Fig. 1.

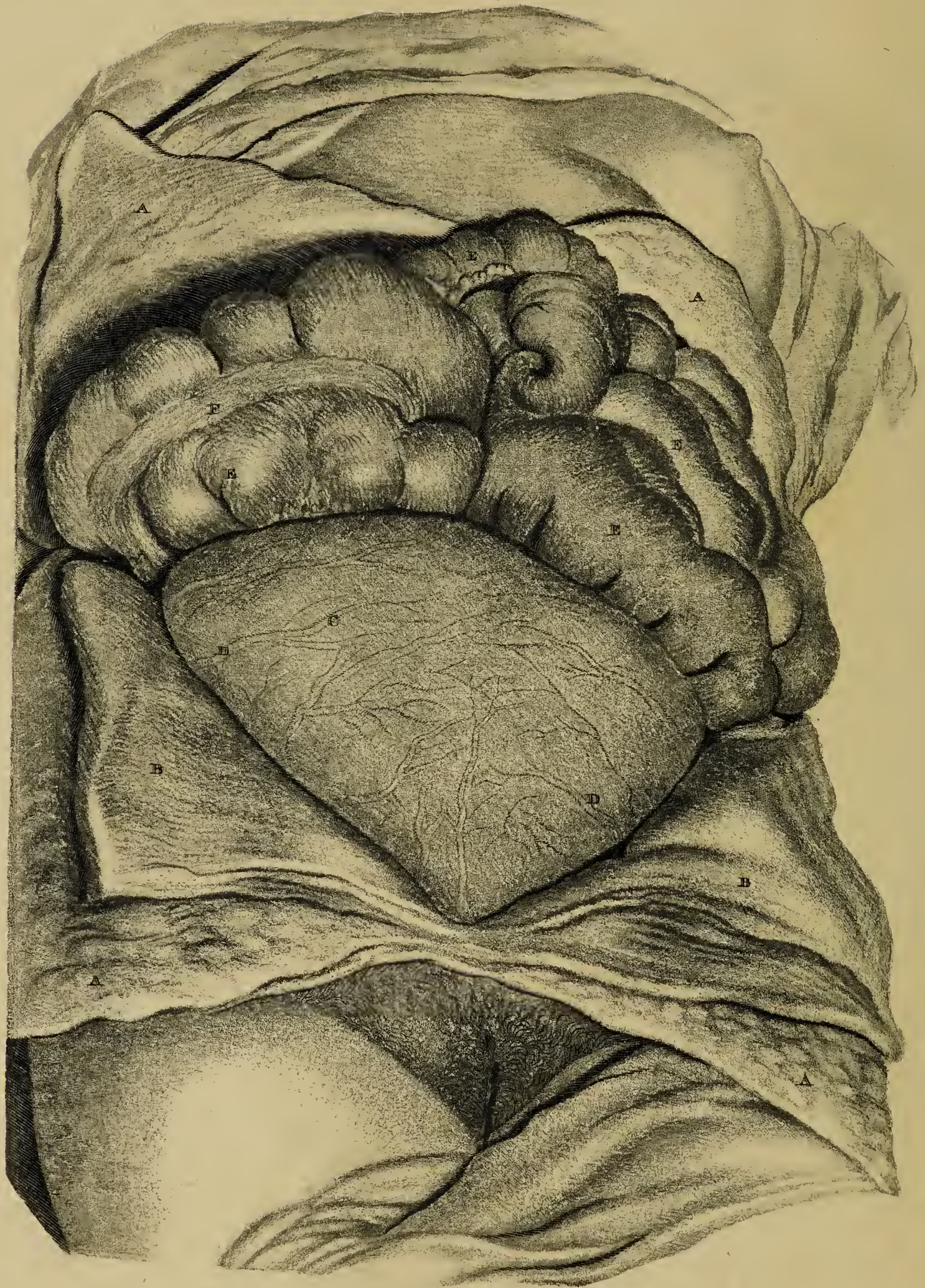


T. A. B. 112.

Fig. 2.



TAB. 113.



Aquatinted by A. Fyfe.

T A B L E C X I I I .

Shews the UTERUS, after Seven Months of Pregnancy.

-
- | | |
|--|---|
| A, A, A, A, The integuments of the abdomen divided and turned back. | D, D, The veins of the uterus much dilated. |
| B, B, The muscles of the abdomen, with the peritoneum also turned back. | E, E, E, The colon and part of the small guts appearing above the fundus uteri. |
| C, The fundus uteri much enlarged, and in this subject inclining towards the right side. | In the right portion of the colon, one of its longitudinal bands of muscular fibres is distinctly seen. |

T A B L E

T A B L E CXIV.

FIG. 1.

From a Woman who died of a Flooding in the Ninth Month of Pregnancy. A View of the UTERUS and VAGINA fully opened on the Back Part, to shew the Situation of the CHILD, and of the lower Part of the PLACENTA, at the Inside of the Mouth of the UTERUS, under the CHILD'S Head, and detached from the UTERUS; the cause of the fatal Hemorrhage.

- A, A, The Fallopian tubes.
 - B, The left ovarium, at the lower end of which is seen,
 - C, The projecting corpus luteum.
 - D, The right ovarium.
 - E, The group of spermatic vessels approaching the side of the uterus.
 - F, F, F, The section of the substance of the uterus.
 - G, The inside of the vagina, which is laid open by a longitudinal incision, and spread out.
 - H, H, The mouth of the uterus.
 - I, The external lobulated surface of the lower part of the placenta, which had originally adhered to the inside of the neck and mouth of the uterus.
 - K, The membranes cut through where they were coming out from the edge of the placenta, and inclosing the most depending part of the child's head.
- The situation, and the several parts of the child, require no explanation.

FIG. 2.

From a Subject in the Ninth Month of Pregnancy. A

Fore-View of the UTERUS, with the VAGINA and the VESICA URINARIA, in which all the inclosing Parts were cut through, and turned up, to shew the Situation of the CHILD, with its Head upwards. The Vessels of the UTERUS had been previously injected.

- A, The bladder in its natural situation with respect to the uterus.
- B, The upper and outer part of the vagina, which lies under the symphysis of the ossa pubis, and where the urethra is united with it.
- C, The cavity of the vagina exposed, where the labia and other external parts have been cut off, in taking this part from the body.
- D, D, The spermatic vessels, passing up towards the sides of the uterus.
- E, E, The tubes, of which the extremities or fimbriae are concealed behind the group of spermatic vessels.
- F, The great vein on the right side of the uterus, formed by the anastomosing, hypogastric, and spermatic veins.
- G, G, The round ligaments.
- H, H, The fore-part of the womb, with that part of the placenta which adhered to it, cut up, and turned back over the fundus of the uterus, to bring the child into view.
- I, I, I, The section of the substance of the uterus, and of the investing membranes.
- K, K, The same section carried through the substance of the placenta, which, in this case, was fixed to the fore-part and right side of the uterus.
- L, The cord passing from the child to the placenta.





Aquainted by A. Eyle.

TABLE CXV.

FIG. 1.

From a Subject at Eight Months. A Side-View of the UTERUS, so injected and dissected, as to shew the Approach, and first general Branching of the UTERINE VESSELS. The Back Part of the UTERUS is still covered by the PERITONEUM; but at the Fore-Part, to which the PLACENTA adhered internally, the Outer Stratum of the Substance of the UTERUS was removed by Dissection.

- A, B, The outside of the neck of the uterus, which was not in the least dilated. The os uteri was opposite to B, from which downwards there is a part of the vagina left covered with fat
 C, C, A stricture in the uterus, where it was surrounded by the brim of the pelvis.
 D, D, The tubes, behind which the ovaria lay concealed
 E, E, The ligamenta rotunda dissected, to shew a vein which is twisted at its inferior part, and two arteries, all from the spermatic vessels.
 F, The hypogastric artery.
 G, ———— vein.
 Their vessels send down numerous branches to the vagina, and ascend upon the side of the uterus, to anastomose with the respective spermatics.
 H, The spermatic artery.
 I, ———— vein.
 These vessels, in their approach to the uterus, send up numerous branches forwards to the tube, and backwards to the ovarium; then passing to the side of the fundus uteri, they anastomose with the hypogastric.
 The principal branches of both, in this case, go to the fore-part of the fundus uteri, where the placenta was attached
 K, K, The edge of the peritoneum, which covers the posterior surface of the uterus.

FIG. 2.

From the same Subject. A Fore-View of the UTERUS.

Its Substance is cut through, and turned up over the FUNDUS, to shew a Part of the MEMBRANES, through which the Child's Head is obscurely seen, and about half of the PLACENTA; together with the corresponding Internal Surface of the UTERUS, and the VESSELS passing between the UTERUS and the PLACENTA. The External Parts of the UTERUS are represented in outlines only.

- A, The upper extremity of the vagina laid open.
 B, The orifice of the uterus contracted.
 C, The neck of the uterus not stretched.
 D, D, The round ligaments.
 E, E, The tubes; the ovaria concealed behind them.
 F, F, The spermatic vessels.
 G, G, The hypogastric vessels.
 H, H, H, The substance of the uterus cut through.
 I, I, I, The fore-part of the uterus raised from the fundus, and turned over the fundus.
 K, The chorion covering the amnios, through which the child's head appears.
 L, L, L, The decidua where it adhered to the inner surface of the womb, in which are seen some small vessels sent into it from the uterus.
 M, M, M, The corresponding inner surface of the uterus.
 N, N, The outer surface of that part of the placenta from which the uterus was separated.
 O, O, The corresponding internal surface of the uterus.
 P, P, Convolute arteries upon the inner surface of the uterus, which had passed to the placenta, and were broken through in separating the uterus.
 Q, Q, The corresponding arteries on the surface of the placenta.
 R, R, Veins emerging from the substance of the placenta, and broken through at its surface, where they were passing into the uterus.
 S, S, The corresponding veins on the inside of the uterus.
 T, A convolute artery, continued from the womb into the placenta
 V, A corresponding vein near that artery, continued from the placenta to the uterus.

T A B L E CXVI.

From a Woman who died suddenly in the end of her Ninth Month of Pregnancy. The ARTERIES and VEINS were injected with Wax of different Colours.

The Plate represents the Object, as it appeared when the ABDOMEN was opened by a Crucial Incision, and the Four Angles of the containing Parts turned outwards; the Subject lying on its Back, with the Upper Part of the TRUNK considerably higher than the rest.

A, A, The under and fore part of the thorax.

B, B, The two upper angles of the integuments, muscles, and peritoneum, turned back over the cartilaginous margin of the thorax.

C, C, The two under angles turned down, and fixed by threads at the puckered appearance of their inferior edges.

D, The upper end of the longitudinal incision, beginning at the point of the cartilago ensiformis.

E, The lower end of the same incision continued to the symphysis of the ossa pubis.

F, The umbilical ligament of the liver.

G, G, The epigastric blood-vessels, projecting through the peritoneum.

H, The small or left lobe of the liver.

I, The omentum, spread over the small intestines in the epigastric region.

K, The lower and middle part of the omentum, which had been pushed up by the uterus, and lay in numerous small folds pressed together.

L, The omentum in the right side, descending some way behind that part of the uterus from which the right tube begins.

M, The omentum, in the left side, which descended before the Fallopian tube, &c. turned a little outwards.

N, N, Two turns of the small intestines, which were partly covered by the portion of the omentum M.

O, The uterus, occupying all the umbilical and hypogastric regions. Its situation is a little oblique, and towards the right side. The letter is placed at the part which was opposed to the umbilicus.

P, A swelling towards the left side of the uterus, where the middle of the placenta adhered, and,

Q, A swelling on the right side, where the buttocks of the child lay.

R, R, The round ligaments of the uterus. The left is the longer of the two, on account of the oblique situation of the uterus.

S, S, Portions of the Fallopian tubes.

T, T, The spermatic vessels, situated in the space between the round ligament and Fallopian tube.





T A B L E CXVII.

A VIEW of the same SUBJECT from the Right Side, after the Upper ABDOMINAL FLAP, and the Containing Parts of the RIGHT HYPOCHONDRIUM had been removed, that the whole Mass of the ABDOMINAL VISCERA might appear in its Natural Situation, the SUBJECT lying on its Back.

-
- A, A, The thighs, covered with a cloth where they had been cut through.
 B, The spine cut through above the diaphragm.
 C, Part of the eighth rib.
 D, D, The integuments and muscles at the back part of the thorax, cut through.
 E, F, The inferior flap of the abdominal muscles, &c. turned down over the thigh, as in the preceding figure.
 F, G, The mons veneris divided and turned aside with the abdominal muscles.
 H, The margin of the thorax at the left side of the scrobiculis cordis; covered by the peritoneum and muscles, which are turned over it.
 I, The cartilago ensiformis.
 K, K, The lower ribs and other containing parts, cut down longitudinally, by which means all the parts between this section and the scrobiculis cordis were removed, to expose the viscera in the right hypochondrium.
 L, The under and back part of the right cavity of the thorax.
 M, The aorta tied up where it was cut, and filled with injection.
 N, The esophagus also tied up.
 O, The upper convex surface of the diaphragm covered by the pleura, in its natural situation.
 P, That part of the centrum tendinosum of the diaphragm which is in the right side.
 Q, The trunk of the inferior cava tied, close to the diaphragm.
 R, The cut edge of the pleura, where it was reflected from the upper surface of the diaphragm to line the inside of the ribs.
 S, The cut edge of the peritoneum, where it was continued from the inferior surface of the diaphragm to the inside of the abdominal muscles.
 Between the cut edge of the pleura, R, and that of the peritoneum, S, is the attachment of the diaphragm cut off from the inside of the ribs.
 T, The inside of the transverse muscle of the abdomen covered by the peritoneum.
 U, The great or right lobe of the liver; the letter is placed opposite to the gall-bladder.
 V, The small lobe of the liver.
 W, The umbilical, or round ligament, cut off where it enters the fissure of the liver.
 X, The colon passing up from the cæcum towards the liver.
 Y, The colon with its appendiculæ adiposæ running towards the left side, between the liver and small guts.
 Z, The beginning or root of the omentum.
 a, a, a, a, Some turns of the small intestines exposed by cutting off part of the omentum which covered them.
 b, The uterus; the veins, which at first could only be distinguished by the colour of the injection in them, are here seen somewhat prominent, on account of the part having been a little dry, by exposure to the air.
 c, The round ligament.
 d, The Fallopian tube. Between the tube and the ligament the spermatic vessels are seen, which go chiefly to the fore-part of the uterus, where the placenta adhered.
 e, The prominent corners of the uterus, where the buttocks of the child were felt before the part was opened.

T A B L E CXVIII.

From the same SUBJECT. This represents the UTERUS opened, to shew the CHILD in its Natural Situation. The upper part of the BLADDER is cut away, to shew the CHILD'S HEAD in the lower part of the UTERUS. All the Fore-part, both of the UTERUS and of the SECUNDINES, which included the PLACENTA, is removed. The UMBILICAL CORD is tied, cut, and turned to the left side, over the edge of the UTERUS. At the FUNDUS, the Investing Membranes are likewise turned over the edge of the UTERUS, that they might be more apparent. The HEAD of the CHILD is lodged in the Lower Part of the UTERUS, or in the Cavity of the PELVIS, and its BODY lies principally in the Right Side. Its position is diagonal, or oblique; so that its Posterior Parts are turned forwards and to the Right Side of the MOTHER, and its Fore-parts directed backwards and to the Left Side. The Right FOOT appears between its Left THIGH and LEG. Its BODY was covered with a White Greasy Mucus, which is commonly seen in CHILDREN at their Birth.

A, A, The thighs.

B, B, Part of the lower corners of the containing parts of the abdomen, turned down over the ossa ilium. They are covered by the peritoneum, which was partly cut away to shew the course of the epigastric vessels.

C, C, The ossa pubis cut through above the foramina ischia.

D, D, The ascending process of the ossa ischia cut through.

E, E, The inguinal arteries.

F, F, ———— veins.

G, G, H, H, The epigastric artery and vein of each side; the former of which is seen uppermost.

I, The obturator artery of the left side, a branch of the epigastric.

K, K, The round ligaments descending from the abdomen upon the outside of the epigastric vessels.

L, L, The section of the integuments and muscles in each groin, which was made in removing the anterior containing parts of the pelvis.

M, The anterior perinæum.

N, N, The lower extremities of the labia pudendi.

O, The remains of the hymen.

P, The vagina.

Q, Q, The crura clitoridis.

R, The urethra slit on its upper part, through its whole length, and spread out.

S, The lower extremity of the uterus lodged in the cavity of the pelvis, and considerably more contracted than the part above it, which lies in the yielding parts of the abdomen.

T, The cluster of spermatic vessels of the left side.

U, U, The cut edge of the uterus.

V, The umbilical cord.

W, The investing membranes turned over the edge of the uterus.







T A B L E CXIX.

A Front VIEW of TWINS in UTERO, in the beginning of Labour, the Anterior Parts being removed.

a, a, The superior parts of the ossa ilia.
b, b, The acetabula.
c, c, A section of the ossa ischia.
d, The os coccygis.
e, The lower part of the rectum.
f, f, The cut edge of the uterus, and of,
g, g, The vagina.
h, The os internum uteri dilated with the membranes
 and waters, in the time of parturition.
i, The inferior part of the uterus stretched with the wa-
 ters which are below the head of the child.

k, k, The two placentæ adhering to the posterior part of
 the uterus. The two fœtuses lie before the placentæ,
 one with its head in the natural position, in the inferior
 part of the uterus, the other situated præternaturally
 with the head to the fundus uteri. The body of
 each fœtus is entangled in its proper cord, which is
 frequently found to happen in the natural as well as
 in the præternatural position.

L, L, &c. The membranes belonging to each placenta.

T A B L E CXX.

The BLOOD-VESSELS of the UTERUS, injected with Wax.

FIG. 1.

Represents the UTERUS of a WOMAN who died thirty-six hours after Delivery.

A, A, The hypogastric urine arteries.
B, B, The spermatic uterine arteries.

The Anastomoses of the Spermatic and Uterine Arteries, and of both with their fellows of the opposite side, are sufficiently obvious without the assistance of letters.

FIG. 2.

Shews the UTERUS, twenty-four hours after Delivery.

A, A, &c. The hypogastric and spermatic uterine arteries.
B, B, &c. ————— veins, with their innumerable anastomoses.
C, C, The ligamenta rotunda.

TABLE

Fig. 1.

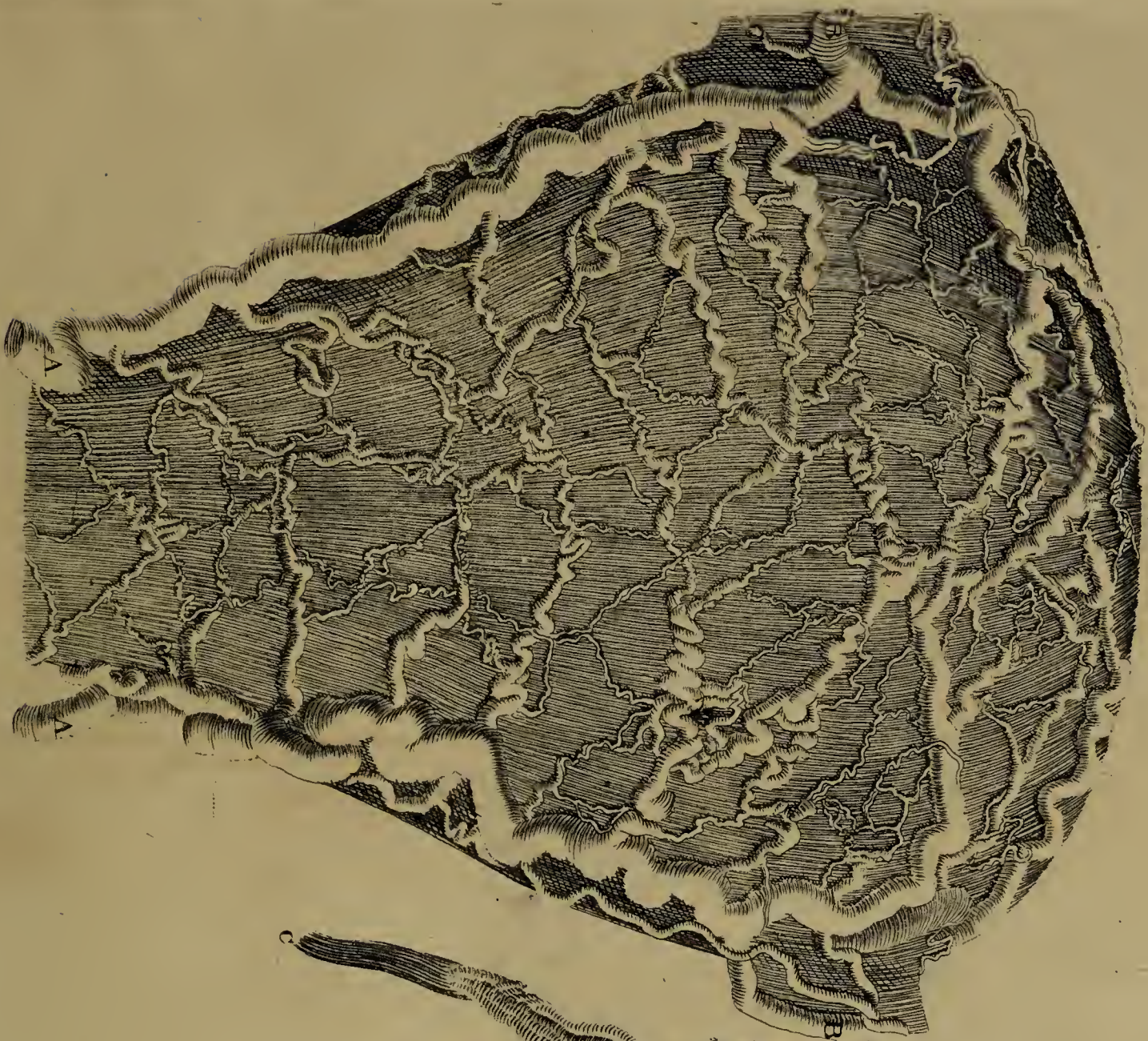


Fig. 2.

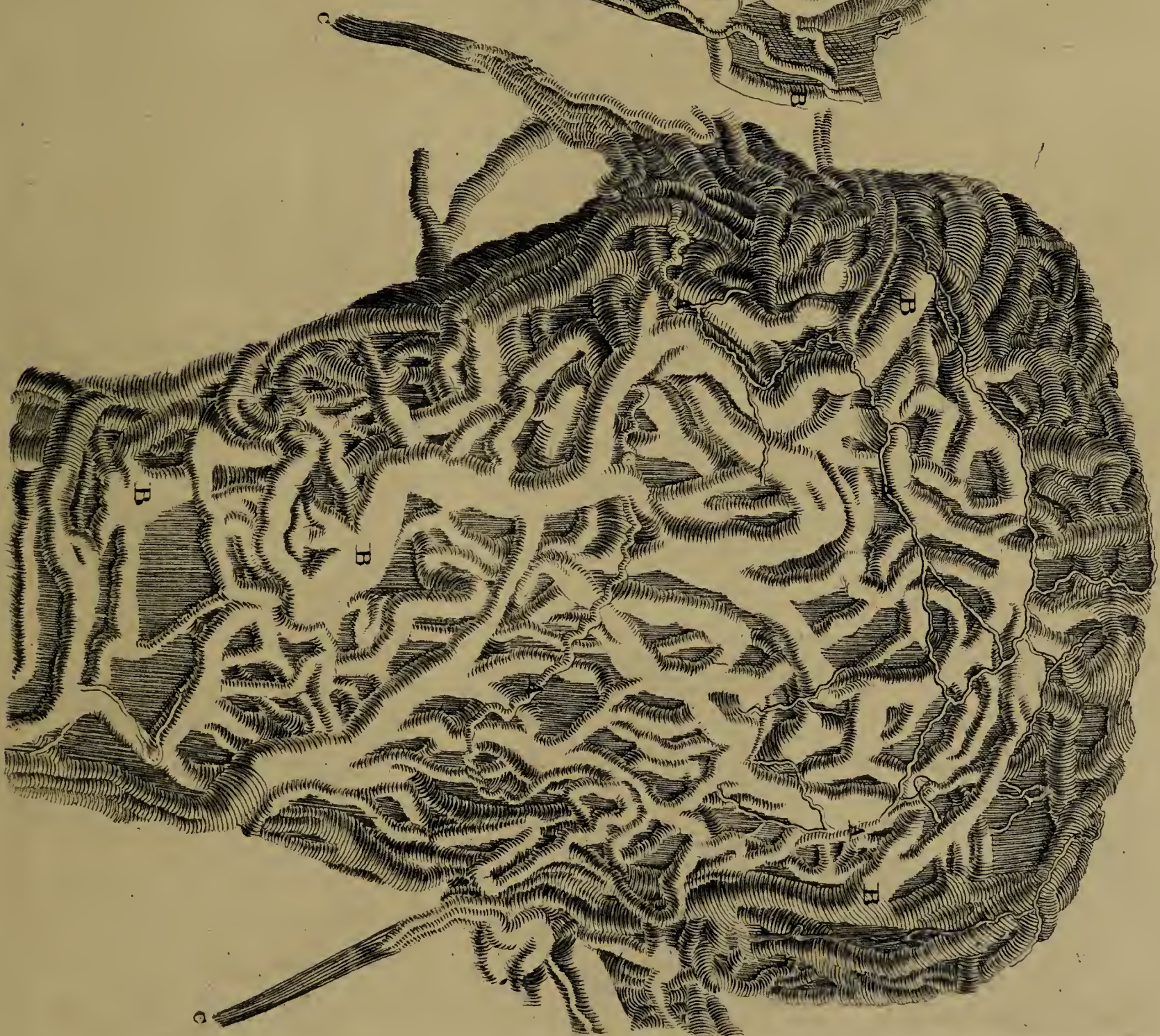


FIG. 1.



FIG. 2.



FIG. 4.

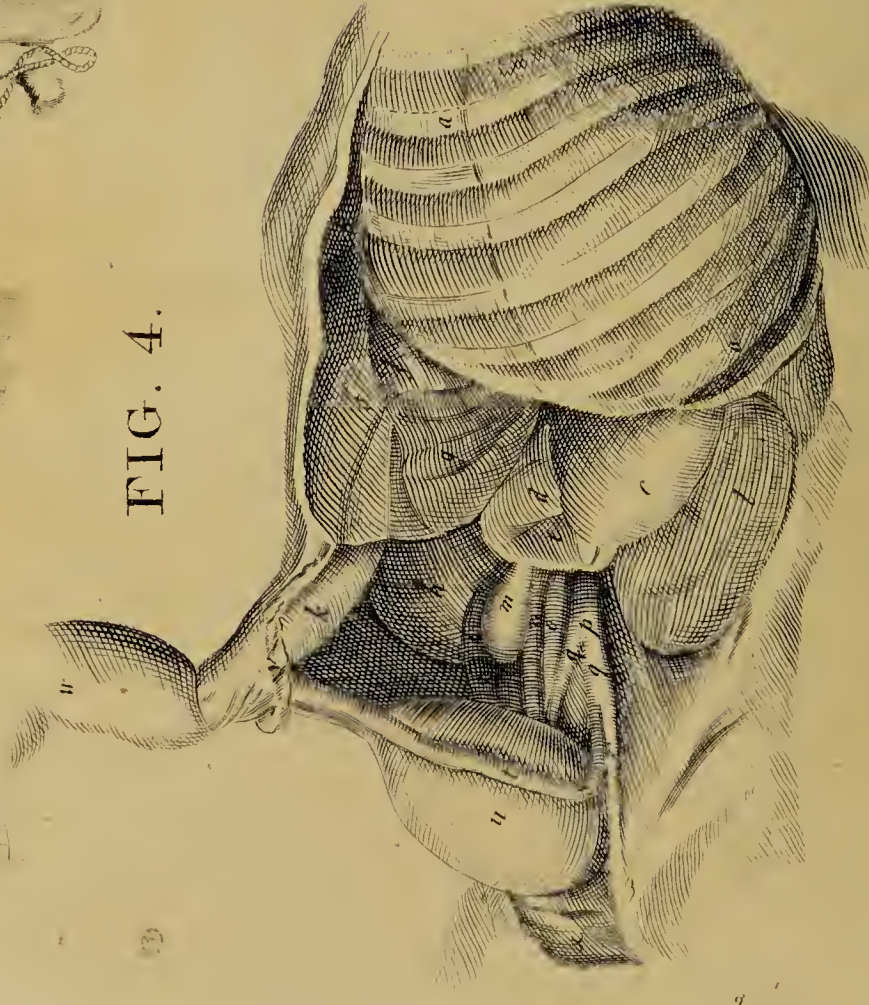


FIG. 7.



FIG. 5.

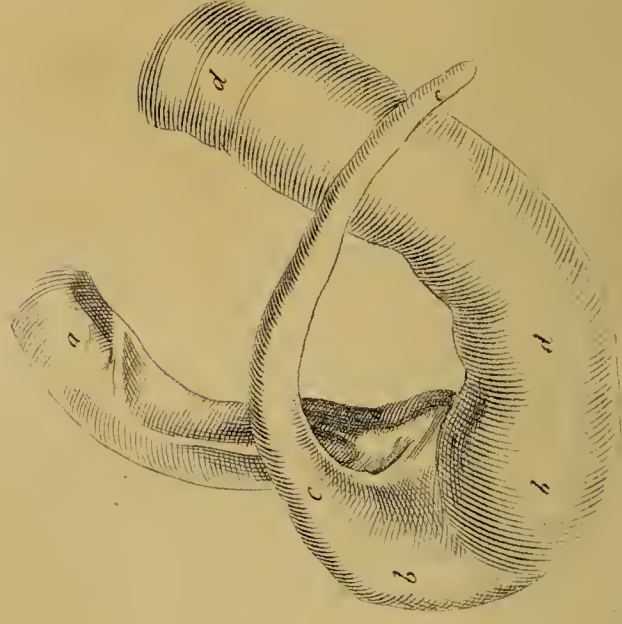


FIG. 8.



FIG. 6.

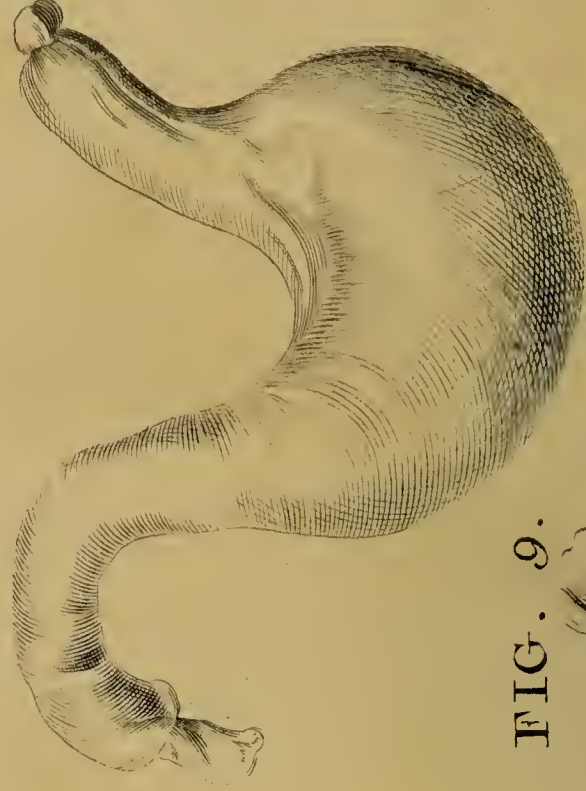


FIG. 9.





FIG. 12.

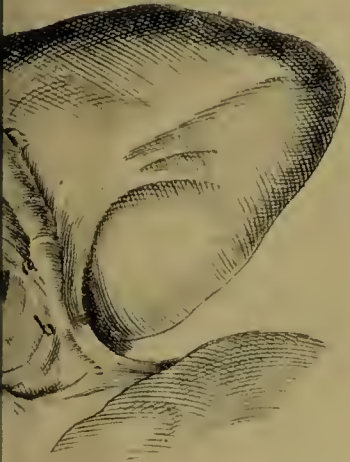
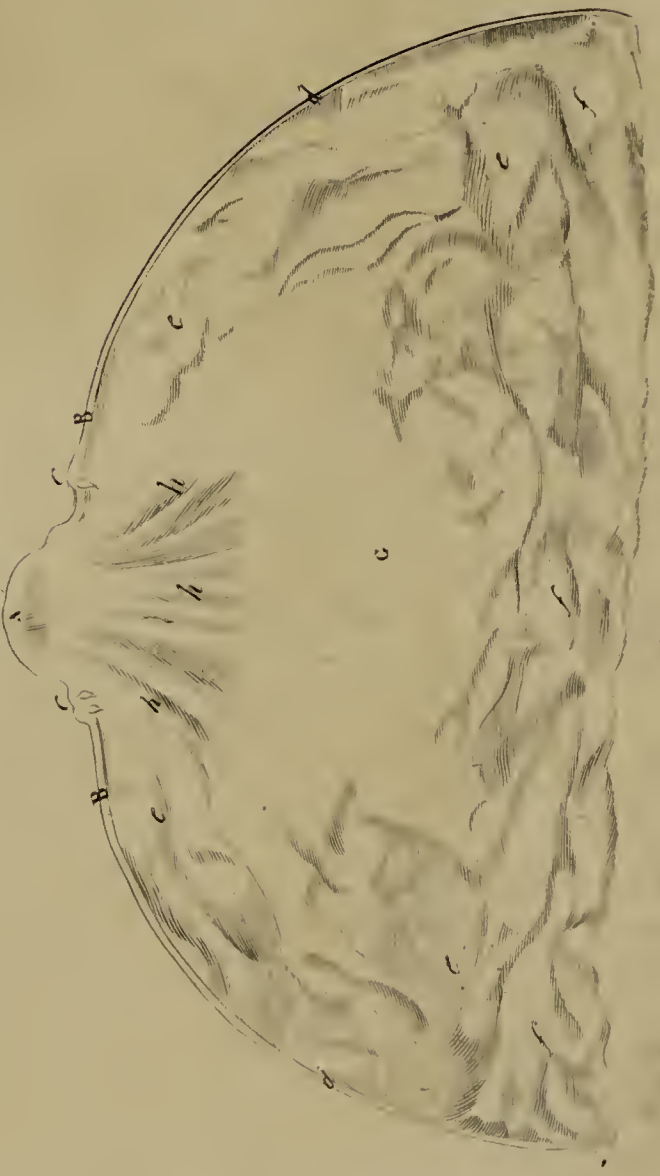


FIG. 10.

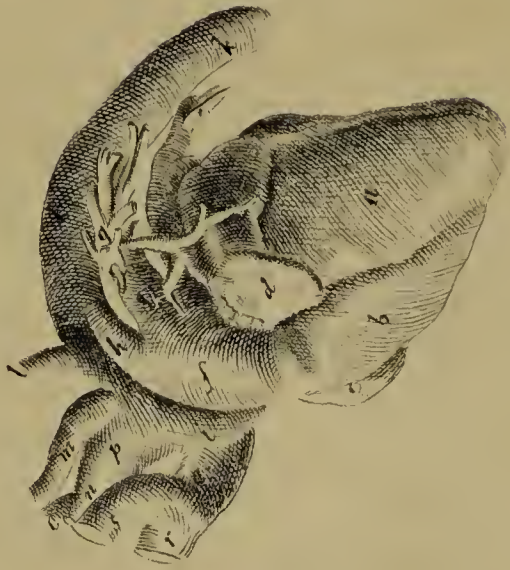


FIG. 13.



FIG. 14.



FIG. 11.



T A B L E CXXI.

FIG. 1. and 2. of this TABLE represent the PLACENTA. From FIG. 3. to FIG. 11. the PECULIARITIES of the Fœtus are shewn. FIG. 12. 13. and 14. give VIEWS of the DUCTS of the MAMMA.

FIG. 1.

A View of the PLACENTA and MEMBRANES.

- A, B, C, The external convex surface of the placenta, with its fissures and lobules corresponding to the inequalities of that part of the uterus to which it adhered.
 D, D, E, The chorion.
 F, Part of the amnios.
 G, A portion of the umbilical cord tied.

FIG. 2.

A View of that Side of the PLACENTA and MEMBRANES next the Fœtus.

- A, A, The amnios separated from the chorion.
 B, B, A portion of the umbilical cord fixed to the inner side of the placenta, some way from its middle.
 C, C, The chorion adhering firmly to the inner concave part of the placenta.
 D, D, Branches of the umbilical arteries, distended.
 E, E, The branches of the umbilical vein, also distended.

FIG. 3.

A Front-View of the CONTENTS of the ABDOMEN, after removing the INTESTINES.

- a, a, The thorax.
 b, b, The diaphragm.
 c, The large lobe of the liver;
 d, Its small lobe.
 e, The gall-bladder.
 f, The stomach.
 g, The pylorus.
 h, A section of the duodenum.
 i, i, The kidneys.
 k, The bladder of urine ascending almost to the umbilicus.
 l, The urachus.
 m, m, The umbilical arteries running along.
 n, n, The umbilical cord.
 o, The umbilical vein passing from the cord to the liver.
 p, The symphysis of the ossa pubis.

- q, r, s, t, The testes, in their descent from the abdomen to the scrotum, inclosed in their vaginal coats.

FIG. 4.

A View of the CONTENTS of the ABDOMEN from the Left Side, after removing the INTESTINES.

- a, a, The ribs.
 b, The cartilago ensiformis.
 c, The stomach.
 d, The pylorus.
 e, A section of the duodenum.
 f, f, The convex surface of the small lobe of the liver, drawn a little up, to shew,
 g, The concave surface.
 h, ————— of the large lobe.
 i, A portion of the gall-bladder.
 k, The umbilical vein entering the liver.
 l, The left, and,
 m, Part of the right kidney.
 n, The right ureter.
 o, The vena cava inferior.
 p, The under end of the aorta.
 q, q, The common iliac arteries.
 r, The external iliac artery.
 s, The internal iliac artery, the continuation of which forms,
 t, The umbilical artery, ascending by the side of,
 u, The bladder of urine.
 v, The umbilicus.
 w, Part of the umbilical cord.
 x, The symphysis of the ossa pubis.

FIG. 5.

The End of the SMALL, and Beginning of the GREAT INTESTINES, viewed from the Left Side.

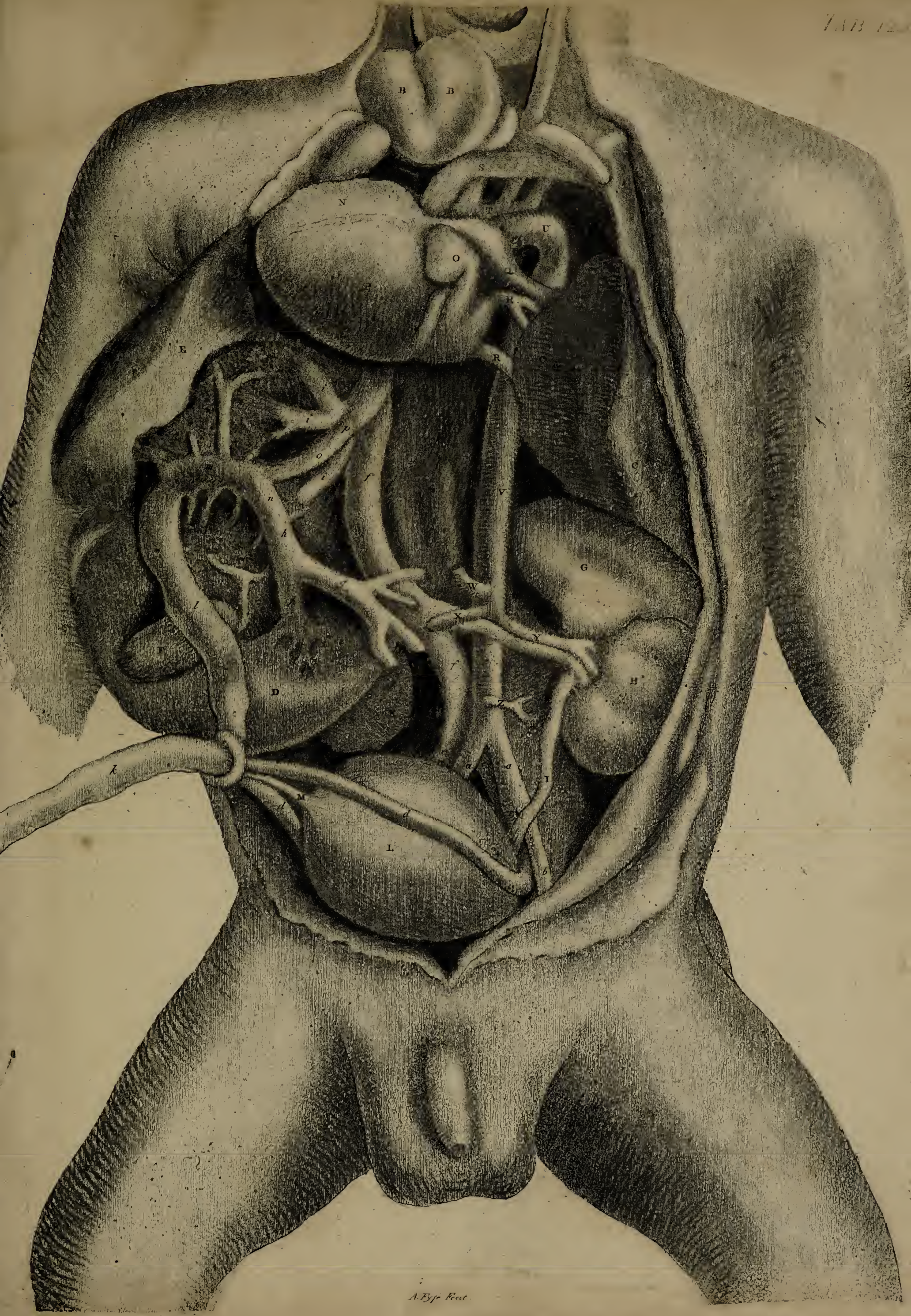
- a, a, A portion of the intestinum ilium.
 b, b, The intestinum cæcum;
 c, c, Its vermiform process.
 d, d, The beginning of the colon.

FIG.

T A B L E CXXII.

In a CHILD born at the full time, the INTEGUMENTS, BONES, and MUSCLES covering the Fore-part of the THORAX, cut and removed, to obtain a View of the VISCERA. The BLOOD-VESSELS were injected with Glue thrown into the UMBILICAL VEIN.

- | | |
|---|--|
| <p>A, A, The cut edge of the integuments and muscles of the thorax.</p> <p>B, B, The upper part of the sternum divided, and drawn out.</p> <p>C, C, A section of the ribs and intercostal muscles.</p> <p>D, D, The flaps, formed by the under part of the integuments and muscles of the abdomen, turned down.</p> <p>E, E, The two lobes of the thymus gland lying over the great vessels at the upper part of the heart; the cornua ascending some way in the neck.</p> <p>F, Veins descending from the thyroid gland.</p> | <p>G, G, G, H, H, The three right, and two left lobes of the lungs, inflated.</p> <p>I, The right auricle, and,</p> <p>K, The right ventricle of the heart.</p> <p>L, L, The cartilaginous margin of the thorax.</p> <p>M, The cartilago-entiformis.</p> <p>N, O, The right and left lobes of the liver, the left extending into the hypochondrium of that side.</p> <p>P, The stomach.</p> <p>Q, Q, The small intestines.</p> <p>R, R, The colon.</p> <p>S, The bladder of urine inflated.</p> <p>T, The urachus.</p> <p>U, U, The two umbilical arteries.</p> <p>V, The umbilical vein.</p> <p>W, The umbilicus.</p> <p>X, The collapsed umbilical cord.</p> |
|---|--|



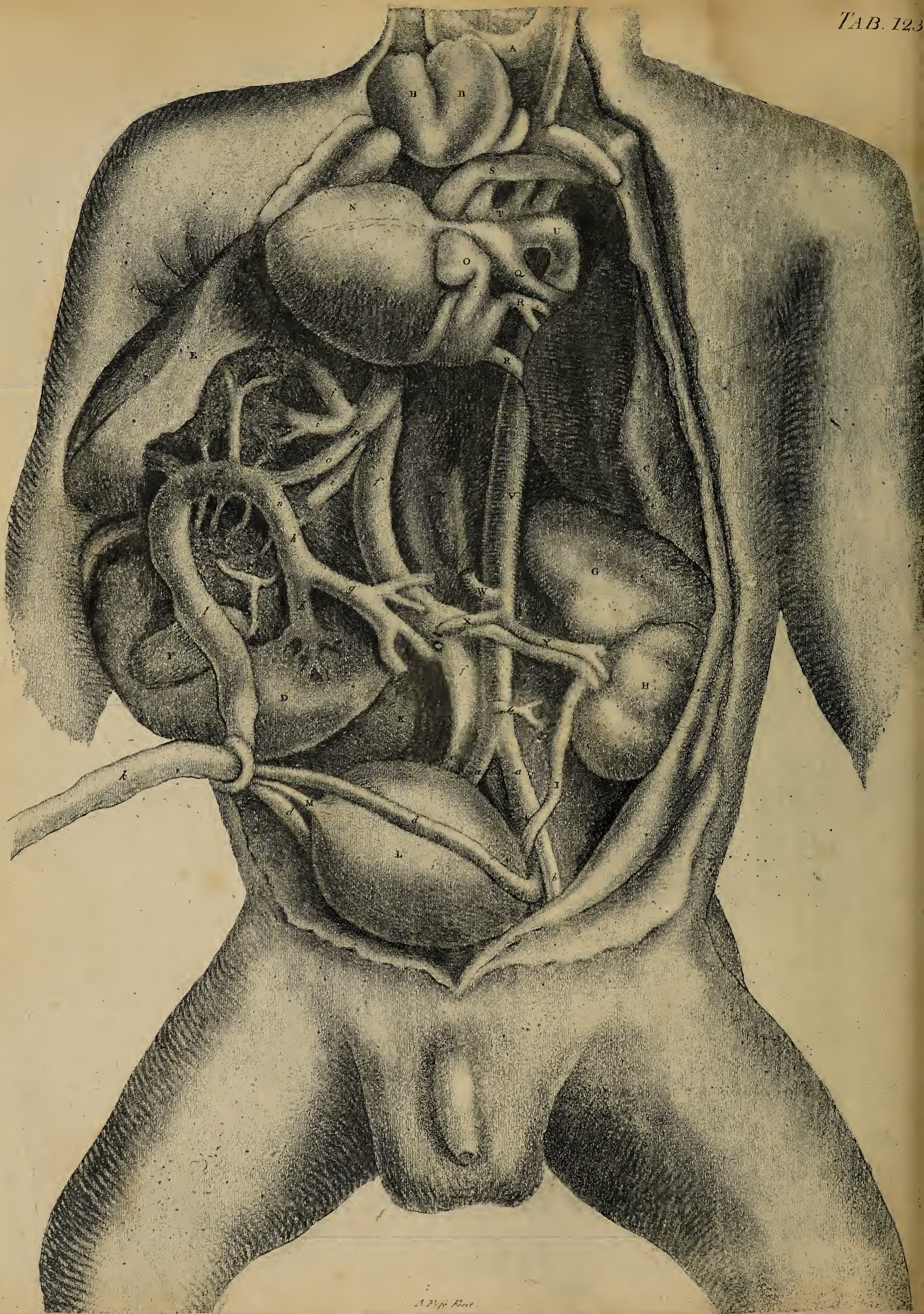


TABLE CXXIII.

The Peculiarities of the BLOOD-VESSELS in the Fœtus, shewn from the same Subject with that represented in the former Table. To the real size of the VESSELS in the Subject of this Figure, particular attention was paid.

-
- | | |
|--|---|
| A, The thyroid gland. | V, The continuation of the aorta descendens. |
| B, B, The lobes of the thymus gland turned up. | W, The cœliac artery. |
| C, C, The left lobes of the lungs. | X, The superior mesenteric artery. |
| D, E, The liver dissected and turned over to the right side; the inferior surface seen; D, the great, and, E, the small lobe. As much of the substance of the liver is dissected away, as to shew the veins which enter it, or come out from it. | Y, The right renal artery, with its corresponding vein. |
| F, The gall-bladder, with the trunks of the biliary ducts. | Z, The inferior mesenteric artery. |
| G, The renal gland of the left side. | a, a, The two common iliac arteries. |
| H, The corresponding kidney. | b, The external iliac artery of the left side. |
| I, The ureter. | c, The root of the internal iliac artery of that side. |
| K, Part of the right kidney. | d, d, The two umbilical arteries running along the sides of the bladder. |
| L, The bladder of urine inflated. | e, e, The common iliac veins. |
| M, The urachus. | f, f, The vena cava inferior. |
| N, O, P, The heart drawn over to the right side; N, the right ventricle; O, the left auricle; P, the left ventricle. | g, The vena portæ. |
| Q, The left branch of the pulmonary artery. | h, h, The right and left branches of the vena portæ. |
| R, R, The corresponding veins, with their termination in the left auricle. | i, i, i, The venæ cavæ hepaticæ. |
| S, The left subclavian vein. | k, The collapsed umbilical cord. |
| T, The arch of the aorta, with the three great arteries sent off from it. | l, The umbilical vein. |
| U, The ductus arteriosus, passing from the trunk of the pulmonary artery into the beginning of the descending aorta. | m, The umbilical vein sending branches to the right and left lobes of the liver, but chiefly to the latter. |
| | n, The trunk common to the umbilical vein and left branch of the vena portæ. |
| | o, The ductus venosus. |
| | p, Its termination, along with the left vena hepatica, in the vena cava, where that great vein is about to perforate the diaphragm. |

T A B L E CXXIIIA.

The HEART of the FœTUS represented in the two last Tables, with the RIGHT AURICLE cut open, to shew the FORAMEN OVALE. The HEART is pulled considerably over to the Left Side, to bring the Parts within the AURICLE properly into View.

-
- | | |
|--|--|
| <i>a, a,</i> The two subclavian veins. | <i>l, l,</i> Two dotted lines marking the size of the passage through the foramen ovale. |
| <i>b,</i> The vena cava superior, with its termination in the upper part of the right auricle. | <i>m,</i> The annulus foraminis ovalis. |
| <i>c,</i> The vena cava inferior, with the venæ hepaticæ terminating in it. | <i>n,</i> The right ventricle. |
| <i>d, d,</i> The right auricle cut open. | <i>o,</i> The pulmonary artery. |
| <i>e,</i> The proper auricle. | <i>p, p,</i> The two pulmonary branches of this artery. |
| <i>f,</i> The valve of EUSRACHIUS over the mouth of the inferior cava, and its oblique situation seen with respect to the termination of the latter. | <i>q,</i> The third branch of this artery, termed <i>Ductus Arteriosus</i> , terminating in the aorta descendens. The dotted lines mark the length of this duct. |
| <i>g,</i> The termination of the great coronary vein at the left side of the Eustachian valve. | <i>r,</i> The ascending aorta. |
| <i>h,</i> The beginning of the foramen ovale, which passes obliquely up between the septum of the auricles, and its proper valve. | <i>s,</i> The arch of the aorta sending off the subclavian and carotid arteries. |
| <i>i,</i> A dotted line opposite to the upper edge of the valve of the foramen ovale. | <i>t,</i> The aorta descendens, after receiving the ductus arteriosus. |
| <i>k,</i> A dotted line at the root of this valve. | <i>u, u,</i> A crooked wire introduced between the ductus arteriosus and aorta. |
| | <i>v,</i> The continuation of the aorta. |

TABLE

TAB. 123A.



A. F. scit.

T A B L E CXXIV.

A VIEW of the Peculiarities in the HEART and BLOOD-VESSELS, with the Situation of the TESTES, in the Fœtus.

FIG. 1.

PECULIARITIES in the VESSELS of the LIVER.

- a*, The umbilical vein.
- b*, The part where it enters the liver.
- b, c*, Branches from it to the liver.
- d*, The vena portarum.
- e*, The division of the vena portarum into two principal branches.
- f*, The left branch of the vena portarum joining the umbilical vein.
- g*, The right branch of the vena portarum to the liver.
- h*, The branch called Ductus Venosus.
- i*, The termination of the duct in the left hepatic vein.
- k*, The hepatic vein terminating in the inferior cava.
- l*, The right hepatic vein.
- m, m*, The inferior vena cava.

FIG. 2.

A View of the Right Side of the HEART, with the AURICLE of that Side laid open, in a CHILD a few days old.

- a*, The superior cava, and immediately below the *a*, the Isthmus VIEUSSENII, or Annulus Fossæ Ovalis.
- b*, The inferior cava.
- c*, The right sinus open near the hepatic veins.
- d*, The orifice of the coronary vein.
- e*, The foramen ovale.
- f*, The opening in the upper part of the foramen ovale, the rest being covered by its valve.
- g*, The right ventricle.
- h*, The left ventricle.

FIG. 3.

The CAVITIES and Large ARTERIES of the HEART of a Fœtus, distended with Wax, and viewed Anteriorly.

- a*, The superior vena cava.
- b*, The right auricle.
- c*, The right ventricle.
- d*, The pulmonary artery.
- e, e*, The two pulmonary veins.

- f*, The ductus arteriosus, continued from the trunk of the pulmonary artery to the beginning of the aorta descendens.

- g, g*, The right and left pulmonary veins.
- h*, The left auricle.
- i*, The left ventricle.
- k*, The aorta descendens.

FIG. 4.

Exhibits the LOINS and PELVIS of a Fœtus at an early Period, to shew the TESTES in the ABDOMEN without any Covering, adhering by the PERITONEUM, with the SPERMATIC BLOOD-VESSELS and VASA DEFERENTIA at a distance from each other.

- a*, One of the lumbar vertebræ.
- b, b*, The muscles of the loins, covered by the peritoneum.
- c*, The sigmoid flexure of the colon.
- d, d*, The kidneys, covered by the peritoneum.
- e, e*, The ureters.
- f*, The bladder of urine, a portion of which is cut off.
- g, g*, The spermatic blood-vessels.
- h, h*, The bodies of the testes.
- i, i*, The epididymis in each side.
- k, k*, The vasa deferentia.
- l*, The spermatic cord of the right side entering the ring of the external abdominal muscle.
- m*, The gubernaculum testis of HUNTER fixed to the bottom of the scrotum, which is here laid open.
- n*, The penis.
- o*, The scrotum.

FIG. 5.

The PELVIS of an ABORTION of about Six Months, to shew the TESTES and other Parts a little more advanced than those represented in the preceding Figure.

- a*, The third vertebra lumborum.
- b, b*, A section of the psoæ muscles.
- c, c*, The peritoneum and muscles of the abdomen covering the crista of the ossa ilium.

D d 2

d, d, The

- d, d*, The colon, at this time destitute of valves, filled with the meconium.
e, The mefo-colon.
f, The left ureter.
g, The penis.
h, The scrotum.
i, i, The spermatic blood-vessels.
k, k, The testes.
l, m, A process on each side formed by the peritoneum; the left one, *m*, descending farther than the right.
n, n, The vasa deferentia.
o, The bladder of urine.
p, p, The umbilical arteries.
q, The urachus.
r, The umbilical vein cut across.
s, s, The anterior and under parts of the abdominal viscera turned down.

FIG. 6.

The Situation of the TESTES in the ABDOMEN of another Fœtus, said also to be about Six Months. The Parts in the ABDOMEN are in general covered by the PERITONEUM.

- A*, The upper part of the abdomen covered with a cloth.
B, B, The thighs.
C, The penis.
D, The scrotum.
E, F, G, The flap of the integuments, abdominal muscles, and peritoneum, turned back.
- H, H*, The lower part of the kidneys.
I, The projection formed by the vertebræ of the loins and large blood-vessels.
K, The rectum filled with meconium, tied at its upper part.
L, A branch of the inferior mesenteric artery which went to the colon.
M, A branch of the inferior mesenteric artery going to the pelvis.
N, The lower part of the bladder, the upper portion being cut off, to obtain a view of the parts behind it.
O, O, The hypogastric, or umbilical arteries.
P, P, The ureters passing over the psoæ muscles and iliac vessels.
Q, Q, The spermatic arteries, somewhat serpentine.
R, R, The testes placed before the psoæ muscles, a little higher than the groins, and turned somewhat outwards, to shew the passage of the spermatic vessels into them in the duplicature of the peritoneum. At the upper end of each testis is seen the beginning of the epididymis, the rest of it being hid by the body of the testis.
S, S, The vasa deferentia in their course to the vesiculæ feminales.
T, T, What MR HUNTER calls the *Gubernacula*, or *Ligaments* of the Testes.—The left ligament is entire, and is seen passing from the under end of the testicle, through the abdominal ring to the scrotum: The right is cut away on its upper and fore part, to shew the beginning of the vas deferens.

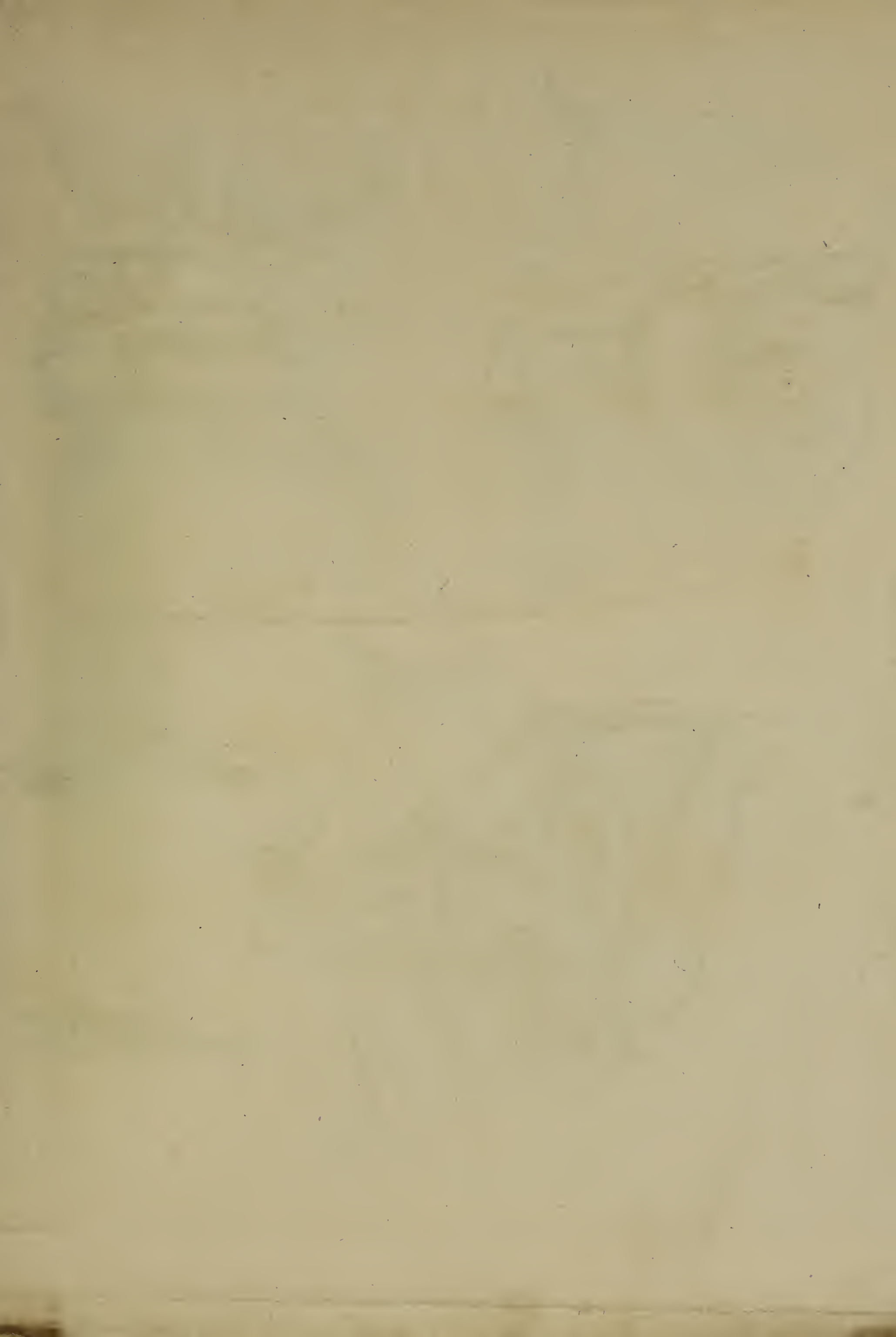


Fig. 1.



Fig. 2.

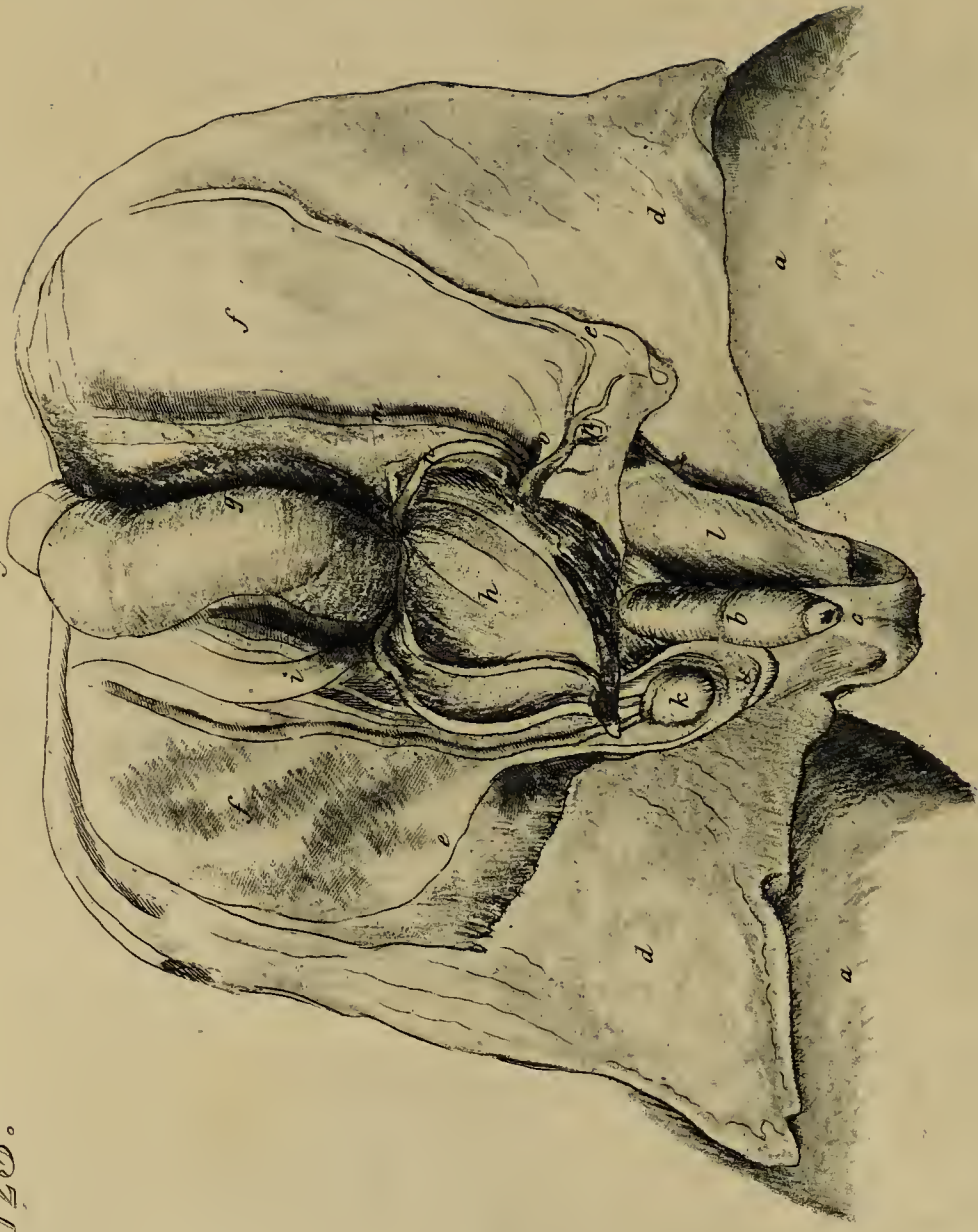


Fig. 3.

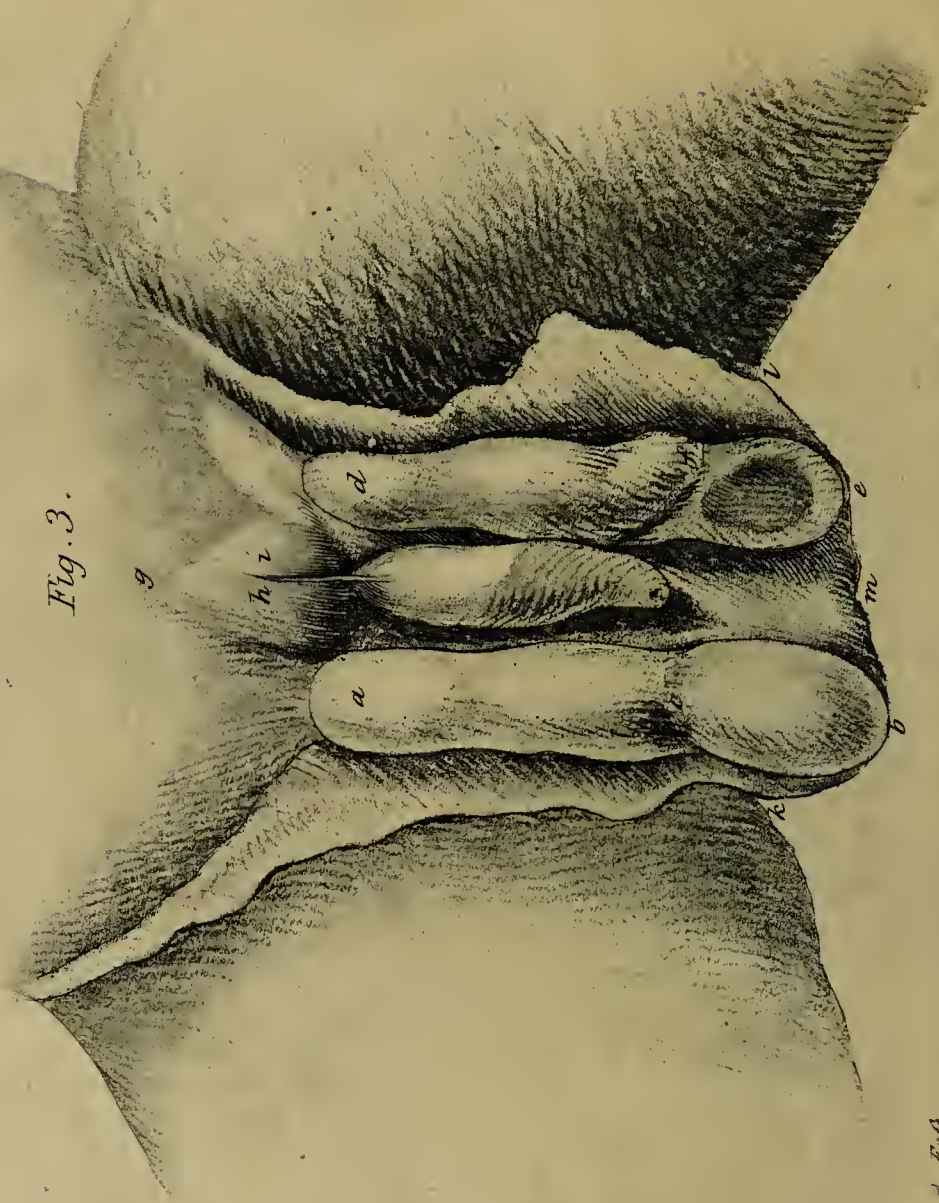


Fig. 4.

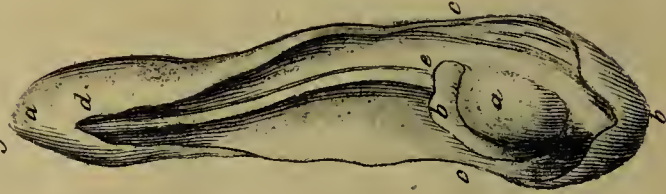


Fig. 5.



T A B L E CXXV.

Additional VIEWS to those shewn in the former Table, of the Situation of the TESTES in the Fœtus at different Periods.

FIG. 1.

In a Fœtus somewhat older than that represented in Fig. 6. of Tab. CXXIV. the State of the TESTES is shewn, when they have recently descended from the ABDOMEN into the SCROTUM. The Small INTESTINES are removed, the Large are left nearly in their natural Situation.

- a, a,* The liver in outlines.
- b, b,* The thighs.
- c,* The penis.
- d,* The middle of the scrotum, the fore-part of the sides of which are cut away, that the testes may appear.
- e, e,* The integuments dissected from the abdomen, and turned down.
- f,* The intestinum cæcum.
- g, g,* The appendix vermiformis.
- h,* The arch of the colon.
- i,* The turn of the colon under the spleen.
- k,* The colon descending on the outside of the left kidney.
- l,* The sigmoid flexure of the colon, which in adults is seated lower in the cavity of the abdomen.
- m,* The beginning of the rectum.
- n,* Part of the abdominal muscles, with the peritoneum turned over the spine of the right os ilium.
- o, o,* The lower part of the obliquus externus of the left side.
- p,* The lower part of the rectus abdominis, so that the epigastric artery appears upon it.
- q,* The bladder of urine.
- r,* The urachus.
- s,* The femoral vessels passing behind the crural arch to the thigh.
- t,* The external surface of the spermatic cord of the left side.
- u,* The appearance of the testicle, when its tunica vaginalis, or process of the peritoneum, is a little distended with air or water poured into it from the cavity of the abdomen.
- v,* The right testis fully exposed, by laying open the peritoneal process through its whole length.
- w,* The epididymis of the same side.
- x, x,* The spermatic blood-vessels.

y, The vas deferens, which, with the spermatic vessels, is covered by the peritoneum.

z, The ureter.

Û, The remains of the gubernaculum testis.

The part of the peritoneum which in this figure is carried down in the form of a hernial sac to a little below the testis, covers the testis, epididymis, spermatic vessels, and vas deferens, in the same manner as it covers the viscera in the cavity of the abdomen; the posterior part of the sac is united with them, and gives them a smooth covering, while the anterior part lies loose before them, and may be removed to some distance from them, as is the case when fluids are generated in the cavity of the sac.

FIG. 2.

Represents the TESTES, &c. in the same Subject as Fig. 1. the Parts above the OSSA ILIUM being cut away, and the ABDOMINAL MUSCLES and BLADDER being turned down.

- a, a,* The thighs.
- b,* The penis.
- c,* The middle of the scrotum, its lateral parts being removed to shew the testes.
- d, d,* The integuments of the abdomen turned down over the thighs.
- e, e,* Part of the abdominal muscles and peritoneum turned down at the groins.
- f, f,* The peritoneum covering the internal iliac muscles.
- g,* The intestinum rectum filled with meconium.
- h,* The bladder, with the umbilical artery at each side of it, turned a little forwards over the symphysis of the pubes.
- i, i,* The ureters passing over the iliac vessels to the pelvis.
- k,* The right testis exposed, as in Fig. 1. *v.*
- l,* The left testicle inclosed in the process of the peritoneum, as in Fig. 1. *u.*
- m,* The spermatic vessels of the left side, seen through the peritoneum which covers them.
- n,* The left vas deferens, seen through the peritoneum, in its passage from the mouth of the sac to the posterior part of the bladder.

o, The

a, The aperture of the process of the peritoneum, by which it communicates with the cavity of the abdomen. This passage generally closes, and the membrane becomes smooth, soon after the testis has got into the scrotum.

p, The left epigastric, branching upon the inside of the rectus muscle, which is turned outwards.

FIG. 3.

Exhibits, in a New-born CHILD, the MEATUS or Passages of the two SPERMATIC CORDS, the Right entire, the Left surrounding the Cord only. The INTEGUMENTS of the ABDOMEN, GROINS, and SCROTUM, and of the upper Half of the PENIS, are removed.

a, b, c, The meatus dexter inflated; *c*, a stricture where the peritoneal process had begun to adhere to the spermatic cord.

d, e, f, The meatus sinister, which at *f* is united with the cord, forming, *e, f*, the tunica vaginalis testis, and, *d, f*, the vagina of the cord.

The tunica vaginalis testis was turgid with a reddish jelly, through which the testicle appeared obscurely, as at the shaded spot.

g, h, i, The muscoli pyramidales.

k, l, m, The integuments of the scrotum laid open.

The two meatus consisted of the processes of the peritoneum, with the cremaster muscles, and a covering from the muscles of the abdomen.

FIG. 4.

The MEATUS DEXTER laid open, to shew its Internal Cavity entire.

a, b, The meatus.

c, The stricture.

A, The testicle.

B, The epididymis.

d, e, The spermatic vessels.

FIG. 5.

The MEATUS SINISTER opened, to shew the SPERMATIC VESSELS and TESTICLE.

e, f, i, The tunica vaginalis testis.

i, e, The stricture where the cord and its coverings are united.

d, i, e, The vaginal coat of the cord.

E, The testicle.

F, The epididymis.

f, g, The spermatic blood-vessels.

f, h, The vas deferens.

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AND OF

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